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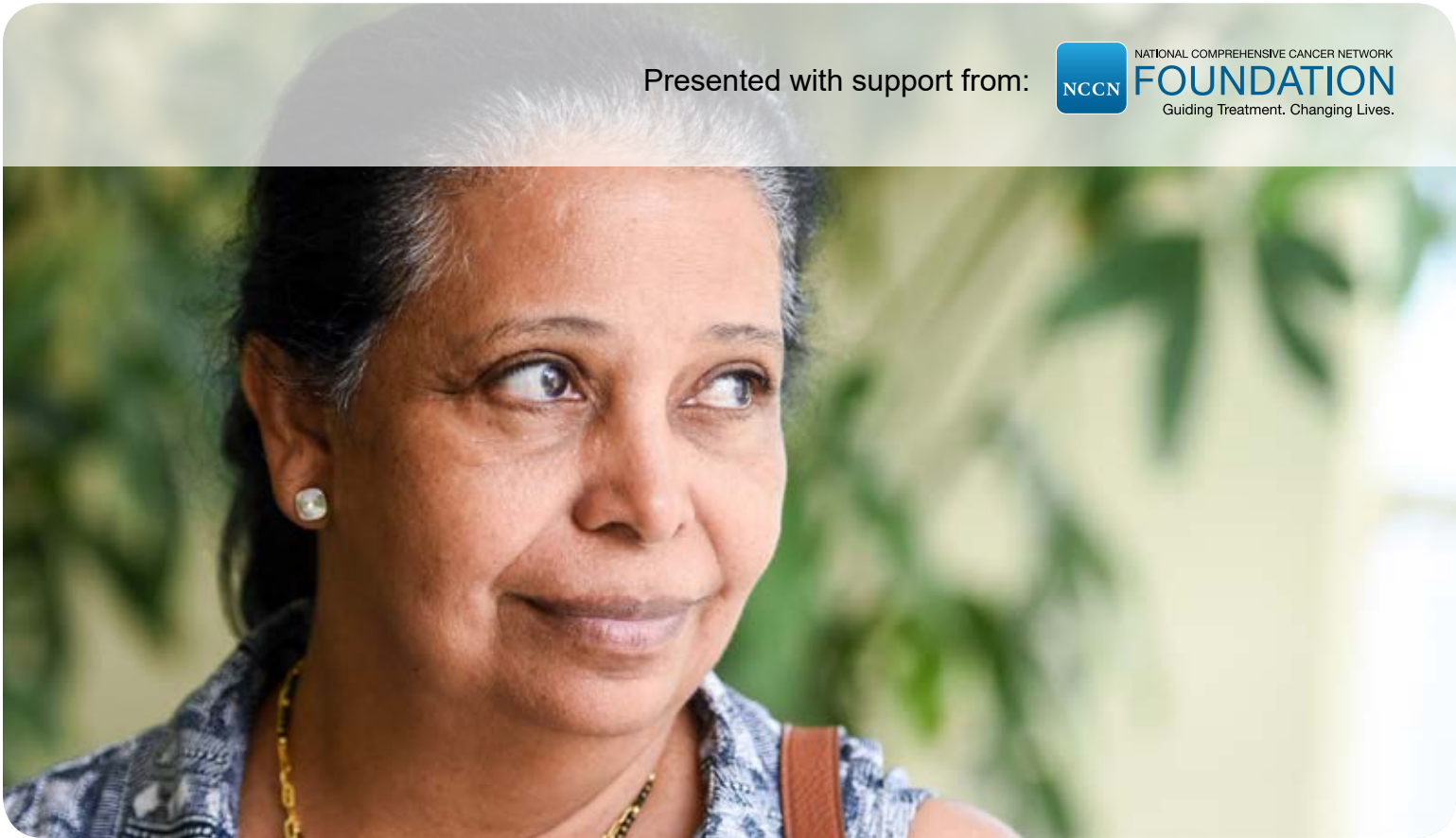
2019

# Pancreatic Cancer

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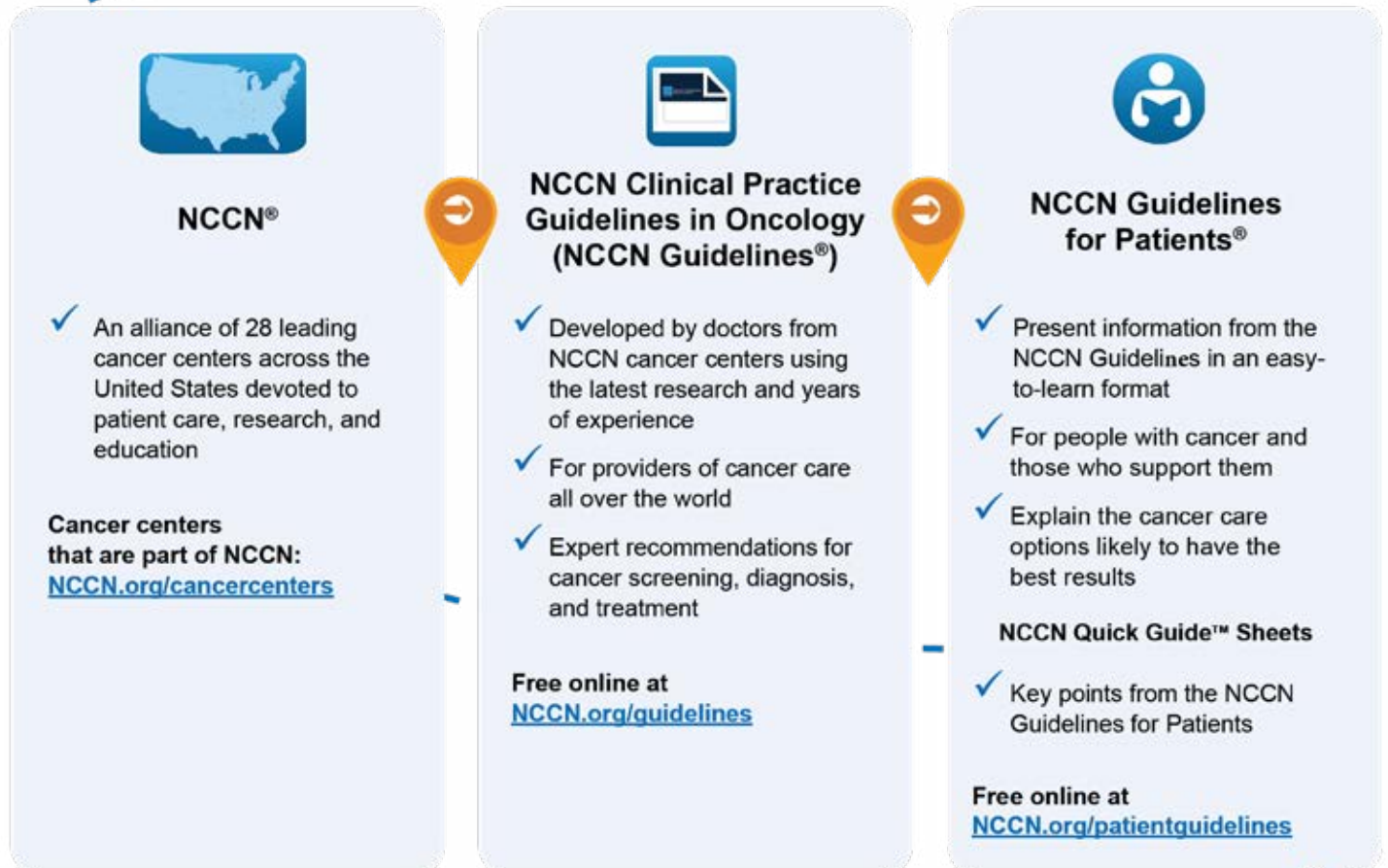
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NCCN Guidelines  
for Patients<sup>®</sup>  
be your guide**

- ✓ Step-by-step guides to the cancer care options likely to have the best results
- ✓ Based on treatment guidelines used by health care providers worldwide
- ✓ Designed to help you discuss cancer treatment with your doctors

# About



## NCCN Guidelines for Patients® are developed by the National Comprehensive Cancer Network® (NCCN®)



and supported by funding from NCCN Foundation®



These guidelines are based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Pancreatic Adenocarcinoma (Version 3.2019, July 2, 2019).

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## Endorsed by

### **Let's Win! Pancreatic Cancer**

The NCCN Guidelines for Patients are the gold standard for pancreatic cancer treatment information. The guidelines provide comprehensive explanations of the disease, stages, and treatments options in language patients can understand. Let's Win! Pancreatic Cancer has included a link to the NCCN Pancreatic Cancer Patient Guidelines since our launch. [letswinpc.org](http://letswinpc.org)

### **The National Pancreas Foundation**

The National Pancreas Foundation provides hope for those suffering from pancreatitis and pancreatic cancer through funding cutting edge research, advocating for new and better therapies, and providing support and education for patients, caregivers, and health care professionals. [pancreasfoundation.org](http://pancreasfoundation.org)

### **Lustgarten Foundation**

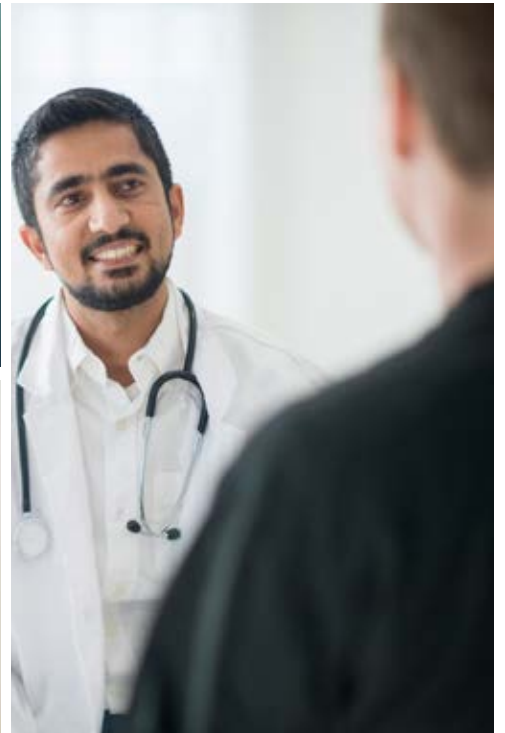
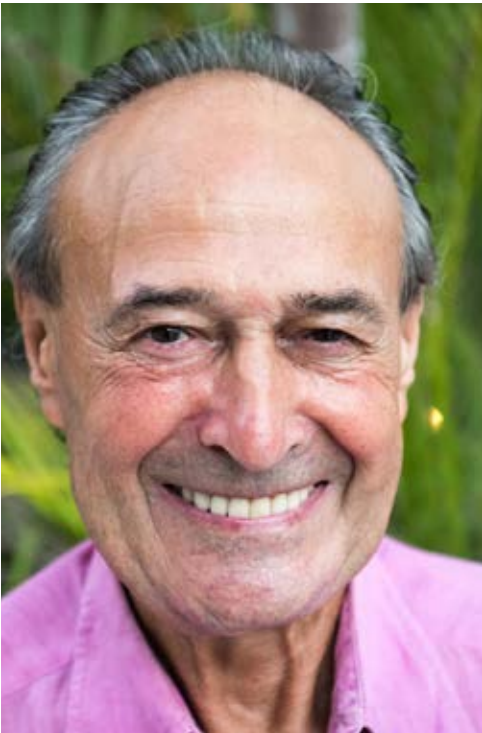
As the world's largest private funder of pancreatic cancer research, we are honored to endorse the NCCN Guidelines for Patients®: Pancreatic Cancer. Receiving a pancreatic cancer diagnosis is both overwhelming and life-altering for patients and their loved ones, and having the most up-to-date, comprehensive information contained in these guidelines is crucial for navigating through this disease. These NCCN Patient Guidelines are a valuable resource for helping everyone impacted by pancreatic cancer to better understand the disease, evaluate treatment options, and make informed decisions. [lustgarten.org](http://lustgarten.org)

### **Pancreatic Cancer Action Network (PanCAN)**

As an organization dedicated to attacking pancreatic cancer on all fronts to improve patient outcomes, the Pancreatic Cancer Action Network (PanCAN) supports the NCCN Guidelines for Patients on pancreatic cancer. This evidence-based resource is a valuable tool to help patients talk to their healthcare team about the best options for treating and managing their disease. [pancan.org](http://pancan.org)

## With generous support from

- Ken & Lisa Ganiszewski in honor of Debbie Hampton.
- Barbara C. Slack in honor of Paul R. Slack.
- The Rev. Sean and Dr. Laura Slack in honor of Paul R. Slack and all those fighting pancreatic cancer.



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# 1

## Pancreatic cancer basics

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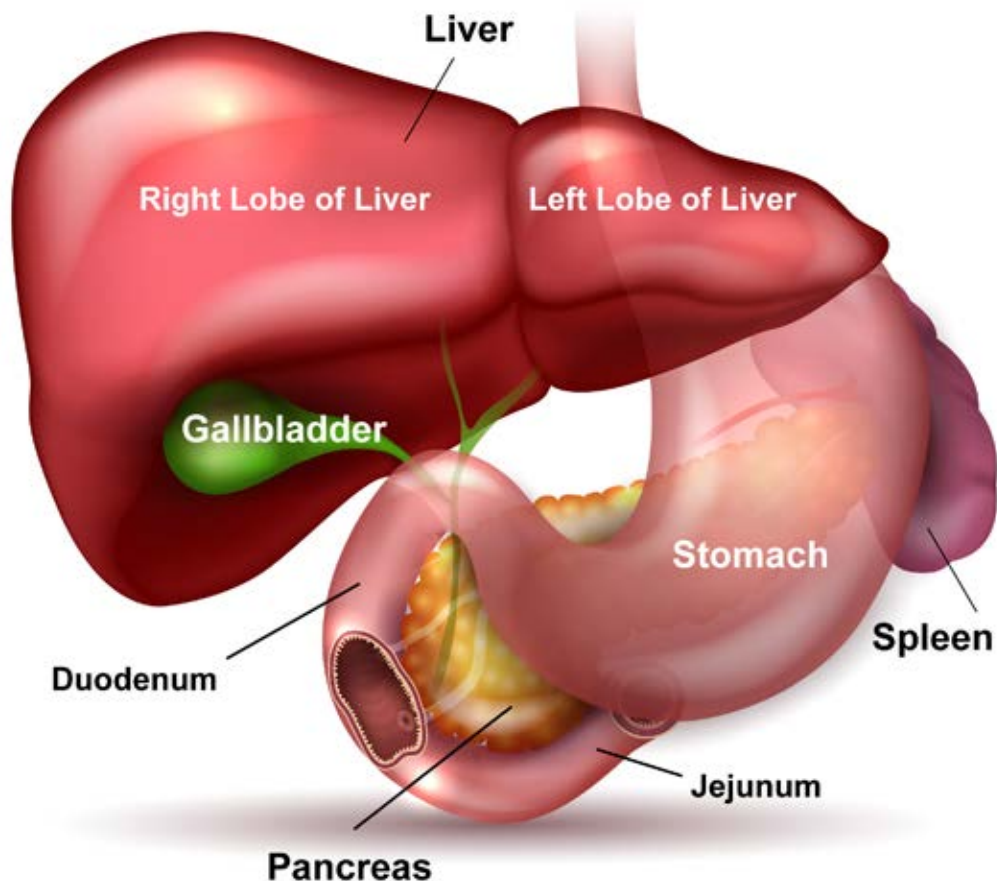
Learn the basics about pancreatic cancer. This will help you prepare and plan for treatment.

## The pancreas

The pancreas is a large gland found in your abdomen behind the stomach. A gland is an organ that makes fluids or chemicals the body needs. The pancreas is about 6 inches long.

Other organs found near the pancreas can be affected by pancreatic cancer. These include the liver, spleen, stomach, gallbladder, and small intestine. The duodenum is the first part of the small intestine. The jejunum is the middle part of the small intestine. The liver is located close to the pancreas, above the gallbladder. The small intestine is wrapped along the wide end of the pancreas. The spleen is found at the tail end of the pancreas. **See Figure 1.**

**Figure 1. Pancreas and nearby organs**



The pancreas has 3 parts:

- Wide end called the head (includes neck and uncinata)
- Middle part called the body
- Narrow end called the tail

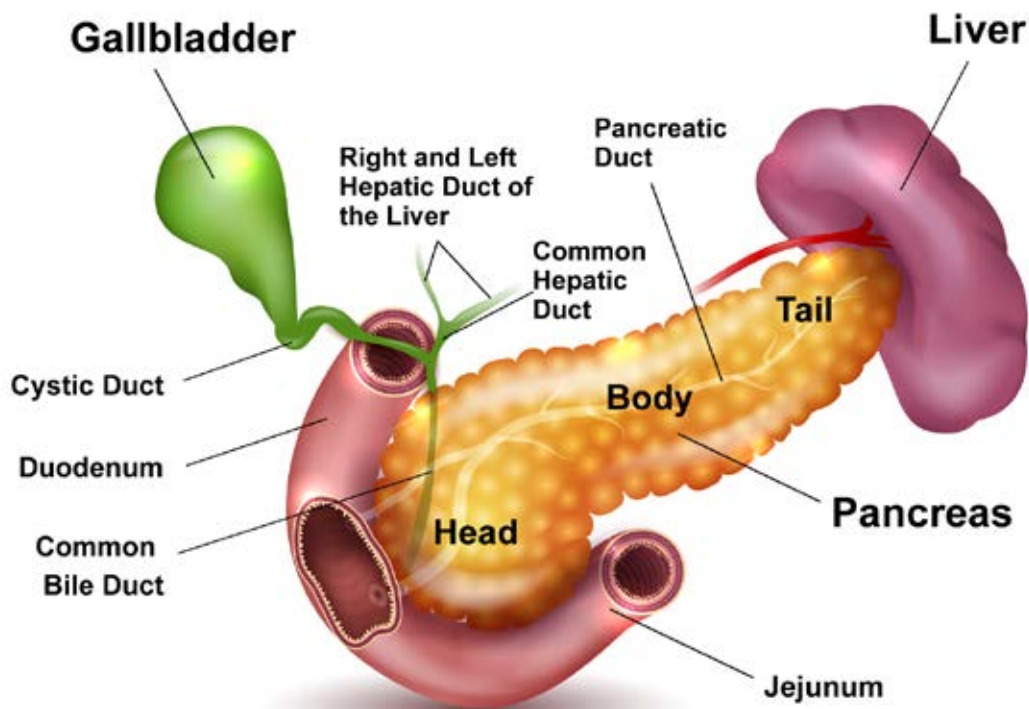
The pancreas does 2 things:

- It makes hormones (insulin and glucagon) that control the amount of sugar (glucose) in your blood. This helps your body use and store energy from food. Removing

part of the pancreas might put you at risk for diabetes. If you have diabetes, it might make it worse.

- It makes a powerful substance called pancreatic enzymes that helps digest food in your small intestine. Removing part of the pancreas can decrease the amount of these enzymes. This can cause oily diarrhea (watery stool), stools that float, abdominal pain, bloating, gas, and weight loss.

**Figure 2. Pancreas, gallbladder, and ducts**



What the pancreas does is important. The pancreas makes hormones, such as insulin. It also makes proteins, called enzymes, which help to digest food.

**Endocrine cells** of the pancreas make hormones. These are released directly into the bloodstream.

**Exocrine cells** release substances into a duct. Enzymes made by exocrine cells are released into the small ducts of the pancreas. Ducts are tiny tubes or vessels that fluids pass through. The small ducts connect to the main pancreatic duct that extends from the tail to the head of the pancreas.

The pancreas lies behind the stomach and across the spine. It is in close contact with the liver, gallbladder, spleen, and duodenum (first part of the small intestine). The liver removes waste from blood and makes bile. Bile is a fluid that helps to digest food. The gallbladder stores bile from the liver. The common bile duct carries bile from the liver into the main pancreatic duct. From the main pancreatic duct, bile and enzymes empty into the duodenum. The duodenum is the first part of the small intestine, which absorbs nutrients from food you eat.

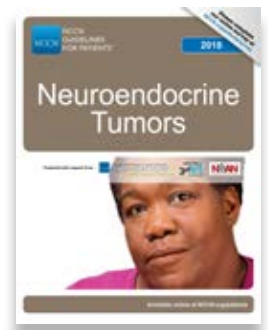
Depending on the size of the tumor and its location, surgery can be very difficult. Surgery will likely affect nearby organs, ducts, and tissues described above. **See Figure 2.**

## Types of pancreatic cancer

Cancer is a disease that starts in the cells of your body. Most cancer is named after the cell from which it formed. Pancreatic cancer starts in exocrine or endocrine cells of the pancreas. Cancer that forms in the ampulla of Vater (ducts from the liver and pancreas that enter at the small intestine) is often mistaken for pancreatic cancer.

### Endocrine

Information on neuroendocrine tumors can be found in *NCCN Guidelines for Patients®: Neuroendocrine Tumors*, available at [www.nccn.org/patients](http://www.nccn.org/patients).



### Exocrine

An exocrine cell makes or secretes an enzyme into the small intestine that helps digest food. Sometimes, pancreatic cancer is also called exocrine cancer. About 9 out of 10 pancreatic cancers start in exocrine cells that line small tubes called ducts of the pancreas. These ducts carry fluid that contain enzymes into the main pancreatic duct and then into the small intestine. Most pancreatic cancers are ductal adenocarcinomas. An adenocarcinoma is cancer in the cells that secrete fluids or other substances.

Exocrine pancreatic cancer is called pancreatic ductal adenocarcinoma (PDAC) and is the focus of this book. PDAC can grow anywhere in the pancreas, but it is most often found in the head of the pancreas.

## Risk factors

Anything that increases your chances of cancer is called a risk factor. Risk factors can be activities that people do, things you have contact with in the environment, or traits passed down from parents to children through genes. Genes are coded instructions for your cells. Risk factors for pancreatic cancer can be found in [Guide 1](#).

### Guide 1. Risk factors

Risk factors for pancreatic cancer
Tobacco smoking
Heavy alcohol use
High body mass index (BMI) or excess fat
Lack of exercise
Genetics
Pre-diabetes
Chronic pancreatitis
Long-term diabetes
Periodontal disease
Family history of pancreatitis
Family history of pancreatic cancer
Contact with chemicals and heavy metals

Genetics can increase the risk for pancreatic cancer. Genetic means that it is passed down from parent to child through genes. Genes tell cells what to become and what to do. In a process called mutation something goes wrong in the genetic code. Mutations may be present before you are born (inherited) or may be caused later in life by genetic damage (acquired). People with inherited genetic mutations have a higher risk for certain cancers, but that doesn't mean they will develop cancer.

Certain syndromes may put someone at risk for pancreatic cancer. Share what you know about your family history with your doctor. Ask questions about your risk for cancer.

Some cancer-related syndromes that increase the risk for pancreatic cancer include:

- Peutz-Jeghers syndrome
- Melanoma-pancreatic cancer syndrome
- Lynch syndrome
- Hereditary breast-ovarian cancer syndrome

Your health care provider might refer you for genetic testing to learn more about your cancer. A genetic counselor will speak to you about the results.

## Symptoms

There are no early warning signs of pancreatic cancer. It is important to tell your health care provider how you are feeling. Doctors need to assess your health and learn about your symptoms. If your doctor suspects pancreatic cancer, you will have blood and imaging tests.

For a list of possible symptoms of pancreatic cancer, [see Guide 2](#).

Having these symptoms does not mean you have pancreatic cancer. There are other health conditions that can cause the same symptoms.

### Guide 2. Symptoms

Symptoms of pancreatic cancer
Weight loss
Floating stools
Nausea
Vomiting
Jaundice (yellowing of the skin and eyes)
Indigestion (eg, heartburn, pain, fullness in belly)
Pain in the abdomen or back
Sometimes pancreatitis
Trouble controlling diabetes
New-onset diabetes

## How cancer spreads

Unlike normal cells, cancer cells can spread and form tumors in other parts of the body. The spread of cancer makes it dangerous.

Cancer that has spread is called a metastasis.

- Cancer that has spread to a nearby body part is called a local metastasis or locally advanced.
- Cancer that has spread to a body part far from the primary tumor is called a distant metastasis.

Locally advanced pancreatic cancer means the cancer has spread to nearby blood vessels and it may be in nearby lymph nodes.

Cancer can spread to distant sites through blood. Two major blood vessels lie behind the pancreas. The superior mesenteric artery supplies the intestines with blood. The superior mesenteric vein returns blood to the heart. Pancreatic cancer can travel through these blood vessels and metastasize in the liver, spleen, stomach, lungs, and other structures.

Cancer can also spread through the lymphatic system. The lymphatic system has a clear fluid called lymph. Lymph gives cells water and food. It also has white blood cells that fight germs. Lymph nodes filter lymph and remove the germs. Lymph travels throughout the body in vessels like blood does. Lymph vessels and nodes are found everywhere in the body.

## Review

- The pancreas helps digest food and control blood sugar.
- Anything that increases your chances of cancer is called a risk factor.
- Pancreatic cancer often starts in the exocrine cells that line the ducts of the pancreas.
- Cancer cells can spread to other body parts through blood or lymph.

### Helpful tips:

- ✓ Keep a list of contact information of all of your health care providers.
- ✓ Ask a caregiver to help you plan your appointments.
- ✓ Use a calendar or day planner to keep track of your upcoming tests and doctor's appointments.



Ask the doctors lots of questions about your type of cancer.  
Take good notes. The more you know about your cancer, the better you can deal with it.

- Sean

# 2

## Testing for pancreatic cancer

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14 General health tests

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15 Imaging tests

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18 Blood tests

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19 Tissue tests

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21 Staging tests

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23 Genetic tests

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24 Test results

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24 Review



Treatment planning starts with testing. Testing is used to confirm (diagnose) pancreatic cancer. This chapter outlines tests used to diagnose and treat pancreatic cancer.

## General health tests

### Medical history

Before and after cancer treatment, your doctor will look at your medical history. A medical history is a record of your past and current medical problems and treatments. Your doctor will ask about all health issues and treatments you have had in your life. Be prepared to list any illness or injury and when it happened.

Bring a list of old and new medicines and any over-the-counter medicines, herbs, or other supplements you take. Tell your doctor about any symptoms you have. A medical history will help determine which cancer treatment is best for you.

### Family history

Some cancers and other diseases can run in families. Your doctor will ask about the health history of family members who are blood relatives. This information is called a family history. You can ask family members about their health issues like heart disease, cancer, and diabetes, and at what age they were diagnosed.

### Physical exam

A physical exam is a study of your body. Doctors should perform a thorough physical exam along with a complete health history. A doctor will check your body for signs of disease.

A health care provider may:

- Check your temperature, blood pressure, pulse, and breathing rate
- Weigh you
- Listen to your lungs and heart
- Look in your eyes, ears, nose, and throat
- Feel and apply pressure to parts of your body to see if organs are of normal size, are soft or hard, or cause pain when touched. Tell your doctor if you feel pain.
- Feel for enlarged lymph nodes in your neck, underarm, and groin. Tell the doctor if you have felt any lumps or have any pain.

Your doctor will also check for jaundice.

Jaundice is a yellowing of the skin and eyes due to a buildup of bilirubin in the body. Bilirubin is a yellow-brown substance in bile that is formed when red blood cells are broken down. Bilirubin is part of bile. Bile is a chemical made by the liver that helps digest fat. It flows through bile ducts in the liver into the intestines. A tumor in the pancreas can cause jaundice by blocking the main bile duct.



## Imaging tests

Imaging tests take pictures (images) of the inside of your body. These tests are used in the diagnosis and follow-up after treatment of cancer. Doctors can see the primary tumor, or where the cancer started, and look for cancer that has spread to other parts of your body. Imaging tests are used to find and confirm (diagnose) pancreatic cancer. They are also used to assess the extent of the cancer to help plan treatment.

A radiologist, who is an expert that looks at patients' images, will review your images and write a report. The radiologist will send this report to your doctor. Your doctor will discuss this report with you. Feel free to ask as many questions as you like.

Common imaging tests:

- X-rays use low-dose radiation to take one picture at a time.
- Ultrasounds use high-energy sound waves to make pictures.
- Computed tomography (CT) scans use x-rays to take pictures from many angles or cross-sections to create three-dimensional or real-looking images.
- Magnetic resonance imaging (MRI) scans use radio waves and strong magnets to make detailed pictures.
- Positron emission tomography (PET) scans use a radioactive drug called a tracer to find disease and take three-dimensional or real-looking pictures. A tracer is a substance put in your body to see how cancer is growing and where it is in the body. Cancer cells show up as bright spots on PET scans.

There is more than one type of imaging scan that may be used for pancreatic cancer. Images can be made with scanning machines or scoping tools. The images may show if there is a tumor in your pancreas as well as the tumor size and location.

The types of imaging scans recommended for pancreatic cancer are described next.

### Your medical records

- ✓ Your doctors will order tests and schedule visits to talk about your care plan.
- ✓ It is helpful to keep track of your test results at all times. Ask your doctors questions about the results.
- ✓ Online patient portals are a great way to view your test results and other records.

**CT scan**

A CT (or CAT) scan uses hundreds of x-rays and computer technology to take pictures from many angles to create real-looking images of the inside of your body. All of the slice-like pictures are combined to make one detailed picture. This type of scan is very good at showing tumors in the pancreas. A CT scan is often the first test given for pancreatic cancer. It is used for tumor staging. **See Figure 3.**

Before the CT scan, you may be given contrast injected into a vein in your arm. A CT scan with contrast uses contrast materials to improve the quality of pictures inside the body. Contrast materials are not dyes, but substances that help certain areas in the body stand out. Tell your doctors if you have had bad reactions to contrast in the past. This is important. Contrast might not be used if you have a serious allergy or if your kidneys aren't working well.

A special type of CT scan, called a pancreatic protocol CT scan, is recommended for pancreatic cancer. A protocol is a detailed plan of a medical study, treatment, or procedure. A pancreatic protocol CT is done in a certain way so that all of the pictures focus on the pancreas and nearby area. This special CT scan allows doctors to clearly see the pancreas, nearby blood vessels, and very small tumors elsewhere in your abdomen.

**MRI scan**

An MRI scan uses radio waves and powerful magnets to take pictures of the inside of the body. It does not use x-rays. An MRI may cause your body to feel a bit warm. Like a CT scan, a contrast material is often used to make the pictures clearer. An MRI is commonly used to look for liver metastasis.

**Figure 3.**  
**CT machine**

**A CT machine is large and has a tunnel in the middle. During the test, you will lie on a table that moves slowly through the tunnel.**



A special type of MRI scan, called a pancreatic protocol MRI scan, is recommended for pancreatic cancer. A pancreatic protocol MRI scan is done in a certain way so that it focuses on the pancreas and nearby areas. This special MRI scan allows doctors to clearly see the pancreas, nearby blood vessels, and very small tumors. For some people, a pancreatic protocol MRI scan may be used instead of CT to view the pancreas.

### MRCP

A magnetic resonance cholangiopancreatography (MRCP) is a type of MRI scan that makes very clear pictures of the pancreas and bile ducts. No contrast is used because bile and other fluids act as their own contrast. An MRCP usually done with an MRI scan.

### Scopes

Some imaging tests use a thin, tube-shaped tool called a scope that is inserted into the body to take pictures. One end of the scope has a small light and camera lens to see inside your body. The image is sent to a television monitor. This will guide your doctor in a biopsy, stent placement, or other tasks.

The scope is guided into the body through a natural opening, such as the mouth or nose. It may also be inserted through a small surgical cut.

More than one type of scope may be used for imaging tests. The type of scope often used for pancreatic cancer is called an endoscope. An endoscope is often guided into the body through the mouth. **See Figure 4.**

### Figure 4. Endoscope

An endoscope is a thin, tube-shaped tool with a light and camera. It is inserted through your mouth and used to look inside your body.



There are 3 types of imaging tests with scopes used for pancreatic cancer:

- Endoscopic ultrasound (EUS)
- Endoscopic retrograde cholangiopancreatography (ERCP)
- Laparoscopy

## EUS

An EUS uses an endoscope that has a small ultrasound probe at the end. The endoscope is inserted through your mouth and guided down your throat and stomach to the first part of the small intestine (duodenum). The ultrasound probe bounces sound waves off your pancreas and other organs to make pictures of the inside of your body.

EUS is used to guide a biopsy of your pancreas and to stage a tumor. Sometimes an EUS can detect small lesions in the pancreas that are difficult to see on a CT or MRI scan.

An EUS is done under sedation to keep you comfortable during the procedure. It might be done with an ERCP.

## ERCP

An ERCP uses an endoscope and x-rays to make moving pictures of the inside of the body. For this test, the endoscope will be inserted through your mouth and guided down your throat and stomach to the duodenum. Next, a thinner tube called a catheter will be passed through the middle of the endoscope. The catheter will be used to inject a contrast material into the pancreatic and bile ducts. The contrast material allows the ducts to be clearly seen on the x-ray pictures.

An ERCP is used to open a blocked bile duct caused by a tumor in the pancreas. During an ERCP, biopsy samples may be taken from the common bile duct. Samples are removed with a small brush at the end of the endoscope. These samples are called brushings. Brushings are taken before stent placement.

An ERCP is done under sedation to keep you comfortable during the procedure. It might be done with an EUS.

## Laparoscopy

This test is a type of surgery that allows your doctors to see organs in your abdomen. It uses a tool like an endoscope called a laparoscope to look for metastases. For this test, the laparoscope will be inserted through a tiny cut in your abdomen. Laparoscopy is done under general anesthesia. This is a controlled loss of wakefulness from drugs. A pancreatic tumor might be biopsied during surgery or laparoscopy.

## Blood tests

Blood tests check for signs of disease, how well organs are working, and treatment results. One common blood test is a complete blood count (CBC). A CBC measures the number of red blood cells, white blood cells, and platelets in your blood. Your doctor will want to know if you have enough red blood cells to carry oxygen throughout your body, white blood cells to fight infection, and platelets to control bleeding.

A blood chemistry test is another common type of blood test. This test measures the levels of different chemicals in the blood. Cancer or other diseases can cause levels that are too low or too high.

Your doctor may change your treatment plan based on the results of blood tests. How often you have blood tests depends on the cancer treatments you receive among other factors.

Other blood tests may include liver function tests and CA 19-9.

### Liver function tests

Liver function tests look at the health of your liver by measuring chemicals that are made or processed by the liver. Levels that are too high or low signal that the liver is not working well or the bile ducts might be blocked.

One of the liver function tests that is measured is bilirubin, a chemical that gives bile its color. There may be too much bilirubin in the blood if a tumor is blocking a bile duct and preventing the free flow of bile from the liver into the intestines. Too much bilirubin causes a yellowing of the eyes and skin called jaundice.

### CA 19-9

CA 19-9 is a substance found in blood that is often high in people with pancreatic cancer. This test is not used by itself to diagnose pancreatic cancer. A CA 19-9 blood test might be used to see if the treatment is working. It may also be measured before and after surgery.

Other health problems besides pancreatic cancer can cause high levels of CA 19-9.

## Tissue tests

In order to confirm cancer, your doctor will do a biopsy. A biopsy is the removal of a tissue or group of cells by a surgeon. A biopsy or brushings look for cancerous cells. Your doctor will order a biopsy to learn more about your cancer and share the results with you.

A pathologist is an expert who will test the biopsy for cancer and write a report called a pathology report. The pathologist may perform other tests to see if the cancer cells have specific genes or proteins. This information will help choose the best treatment plan for your type of cancer. Ask questions about your biopsy results and what it means for your cancer treatment.

If no cancer cells are found, a biopsy may be taken from another part of the pancreas. Biopsies are the final step in a cancer diagnosis. You might need more than one biopsy and more than one type of biopsy. Ask your health care provider about the type of biopsy you will have and what you can do to get ready.

There are different types of biopsies. One type is a fine-needle aspiration (FNA) biopsy.

### FNA biopsy

An FNA biopsy uses a very thin needle to remove the tissue sample. It is the most common type of biopsy used to confirm pancreatic cancer.

There are 2 types of FNA biopsies:

- EUS
- CT or ultrasound-guided

**EUS-FNA**

An EUS-guided FNA biopsy or EUS-FNA uses a thin needle attached to the end of the endoscope. An endoscope uses a lighted scope passed through the mouth and throat down into your stomach. An ultrasound probe at the end of the endoscope bounces sound waves off organs and tissues to make a picture of the inside of your body. Your doctor uses these pictures to guide the endoscope and needle to the right spot. Then the needle is inserted through your stomach or duodenum and into the tumor in your pancreas to remove a tissue sample. You might have more than one EUS-guided biopsy.

**CT or ultrasound-guided FNA**

In a CT or ultrasound-guided FNA biopsy, a thin needle is inserted through the skin and into the tumor using a CT scan or ultrasound as a guide to find the right spot. The CT scan takes many pictures of a part of the body from different angles using x-rays. An ultrasound is a test that uses sound waves to take pictures of the inside of the body. Your doctor will use these pictures to find the tumor in your pancreas and guide the needle to the right spot. For this type of biopsy you will be given local anesthesia. It is called local because this anesthesia causes a loss of feeling in a small area of the body.

**Guide 3. Pancreatic cancer groups based on pre-surgery imaging tests**

Group	What does it mean?	Can surgery be done?	Why?
<b>Resectable</b>	Cancer has not spread outside the pancreas.	Yes, tumor can be removed completely with surgery.	Tumor has not grown into nearby arteries or veins.
<b>Borderline resectable</b>	It is hard to tell from imaging tests if the cancer has spread to nearby tissues.	It is unclear if the tumor can be removed with surgery.	Tumor may or may not have grown into nearby arteries and veins.
<b>Locally advanced</b>	There is cancer (metastasis) in nearby lymph nodes and tissues.	Tumor may or may not be removed with surgery. Lymph nodes may be resectable.	Tumor has grown into nearby lymph nodes and tissues.
<b>Metastatic (unresectable)</b>	Cancer has spread to distant parts of the body.	No, tumor cannot be removed with surgery.	Tumor has grown into surrounding tissues and has spread to distant parts of the body.

## Staging tests

Staging tests are used to measure the size of the primary tumor, to see if and where the cancer has spread, and to look at the pancreas and nearby tissues. In pancreatic cancer, staging is done using a CT scan and other imaging tests. You will have imaging tests to see if surgery is an option.

If surgery is an option, your cancer is resectable (can be removed completely with surgery). If surgery is not an option, then your cancer is unresectable (cannot be removed by surgery). Sometimes, imaging tests cannot clearly show one way or the other. In this case, pancreatic cancer is called borderline resectable. In borderline resectable pancreatic cancer, the tumor involves nearby veins and arteries. [See Guide 3.](#)

A team of doctors will need to look at your test results and agree on the best way to treat your cancer. They will discuss if surgery is an option. Cancer that has spread the liver, spleen, lymph nodes, and other tissues that line and cover the organs in your abdomen are hard to see

with imaging tests. You might have a staging laparoscopy to rule out metastases not found on imaging tests. Sometimes, cancer cells are too small to be seen. These cells can grow into cancer later.

Staging is needed for treatment. Pancreatic cancer is very difficult to treat because it is usually found when it has already advanced. Even when found early, pancreatic cancer is likely to have already metastasized. You will have imaging tests throughout your treatment to see how the cancer is responding.

When your doctor suspects pancreatic cancer or there might be an issue with your pancreatic or bile ducts, a pancreatic protocol CT is usually the first test. A pancreatic protocol CT is a special type of CT scan with contrast that takes pictures as the contrast moves through the arteries and veins of the pancreas. These clear and detailed images of your pancreas and nearby blood vessels allow doctors to see where the tumor is in the pancreas and if the tumor involves any veins, arteries, or organs. A pancreatic protocol will also help to see if there are metastases. [See Guide 4.](#)

### Guide 4. When your doctor suspects pancreatic cancer

What could it be?		What test do I need?		What is next?
Pancreatic cancer or	➔	Pancreatic protocol CT	➔	If it is cancer, a team of doctors will need to agree on: <ul style="list-style-type: none"> <li>• if it is metastatic or non-metastatic cancer</li> <li>• if surgery is an option</li> </ul>
Dilated (enlarged) pancreatic duct and/or				
Narrowing of bile duct				

Certain tests are recommended to confirm (diagnose) pancreatic cancer and to see how far it has spread. A CT of the chest and pelvis are needed to fully stage pancreatic cancer. Tests will be based on if there are or aren't metastases. Results from these tests will help guide your treatment plan. [See Guide 5.](#)

**Performance status**

Performance status (PS) is a person's general level of fitness. Your state of general health will be rated using a PS scale called ECOG (Eastern Cooperative Oncology Group). PS scale scores or grades range from 0 to 4. This score helps doctors decide what kind of pancreatic cancer treatment is best for you.

- PS 0 means you are fully active.
- PS 1 means you are still able to perform light to moderate activity.
- PS 2 means you can still care for yourself but are not active.
- PS 3 means you are limited to the chair or bed more than half of the time.
- PS 4 means you need someone to care for you and are limited to a chair or bed.

In pancreatic cancer treatment, PS will be referred to as good or poor. Good PS is usually PS 0 or PS 1. Supportive care, or palliative care, is recommended for those with a poor performance status (PS 2, PS 3, or PS 4). Supportive care is health care that relieves symptoms caused by cancer and improves quality of life.

**Guide 5. Tests to confirm pancreatic cancer based on if there are metastases**

Metastases		Next tests	Possible tests		Test results
No metastases		<ul style="list-style-type: none"> <li>• Chest and pelvic CT</li> <li>• Liver function test</li> <li>• Baseline CA 19-9 after good biliary drainage</li> </ul>	<ul style="list-style-type: none"> <li>• EUS</li> <li>• MRI</li> <li>• PET/CT</li> <li>• ERCP with stent</li> <li>• Germline testing</li> </ul>		If no tumor or cancer not confirmed, then follow-up at high-volume center.
					Resectable
					Borderline resectable
					Locally advanced
					Metastatic
Metastases		<ul style="list-style-type: none"> <li>• Biopsy metastases to confirm cancer</li> <li>• Germline testing</li> </ul>	<ul style="list-style-type: none"> <li>• Gene testing of tumor</li> </ul>		Metastatic



## Genetic tests

Your health care provider might refer you for genetic testing to learn more about your cancer. A genetic counselor will speak to you about the results.

There are 2 types of genetic tests used in pancreatic cancer:

- Germline testing
- Tumor testing

### Germline testing

Germline testing is done using blood or saliva (spitting into a cup). The goal is to look for germline mutations. Germline mutations are passed down from parent to child. They are inherited. Types of germline mutations for pancreatic cancer include:

- *BRCA1*
- *BRCA2*
- *PALB2*

If you have one or more of these germline mutations, your doctor might choose a platinum-based systemic therapy or a treatment that is known to work better for your mutation. You might notice that some of the germline mutations like *BRCA1* or *BRCA2* are related to other cancers such as breast, ovarian, prostate, colorectal, or melanoma skin cancer. This is because some mutations can put you at risk for more than one type of cancer. You can pass these genes on to your children. Also, family members might carry these mutations. Germline testing is recommended for anyone with confirmed pancreatic cancer.

### Tumor testing

A sample from a biopsy of your tumor will be tested to look for biomarkers or proteins. This information is used to choose the best treatment for you. Tumor testing is recommended for patients with locally advanced or metastatic disease. It is sometimes called gene profiling or molecular testing.

#### MSI testing

Microsatellites are short, repeated strings of DNA (the information inside genes). When errors or defects occur, they are fixed. Some cancers prevent these errors from being fixed. This is called microsatellite instability (MSI). Knowing this can help plan treatment.

#### MMR testing

Mismatch repair (MMR) helps fix mutations in certain genes. When MMR is lacking, these mutations may lead to cancer. Knowing this can help plan treatment or predict how well treatment will work with your type of tumor.

**Germline testing  
is recommended  
for anyone  
with confirmed  
pancreatic cancer.**

## Test results

Results from your blood tests, imaging studies, and biopsy will determine your treatment plan. It is important you understand what these tests mean. Ask questions and keep copies of your test results. Online patient portals are a great way to access your test results.

Whether you are going for a second opinion, test, or office visit, keep these things in mind:

- Bring someone with you to doctor visits. Encourage this person to ask questions and take notes.
- Write down questions and take notes during appointments. Don't be afraid to ask your care team questions. Get to know your care team and let them get to know you.
- Get copies of blood tests, imaging results, and reports about the specific type of cancer you have. It will be helpful when getting a second opinion.
- Organize your papers. Create files for insurance forms, medical records, and test results.
- Keep a list of contact information for everyone on your care team.

## Review

- Tests are used to plan treatment and check how well treatment is working.
- In pancreatic cancer, staging is first done using imaging tests.
- A biopsy is needed to confirm pancreatic cancer.
- Pancreatic cancer that can be removed completely with surgery and has not spread outside the pancreas is called resectable.
- When it is unclear if pancreatic cancer can be removed with surgery it is called borderline resectable.
- Pancreatic cancer that has spread to nearby blood vessels and lymph nodes is called locally advanced. It may or may not be resectable.
- Pancreatic cancer that has spread to distant parts of the body is called metastatic. It is unresectable.
- Performance status (PS) indicates a person's general level of fitness and is used in making treatment decisions.

# 3

## Pancreatic cancer treatment

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- 30 Systemic treatments
- 32 Clinical trials
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- 34 Review



There is more than one treatment for pancreatic cancer. This chapter describes treatment options and what to expect. Discuss with your doctor which treatment might be best for you.

Pancreatic cancer is rarely cured. The goals of treatment are to control cancer growth, reduce symptoms, and extend life. Treatment can be local, systemic, or a combination of both. Local therapies target specific areas of the body that contain cancer cells. Systemic therapies attack cancer cells throughout the body.

There are 2 types of treatment:

- **Local therapy** focuses on a certain area. It includes surgery and radiation therapy.
- **Systemic therapy** works throughout the body. It includes chemotherapy, targeted therapy, and immunotherapy. Systemic therapy is used in all stages of pancreatic cancer.

## Local treatments

Local treatments remove or destroy individual tumors or cancerous tissues. This type of treatment can be surgery or radiation. It treats a specific area of the body.



### Surgery

Surgery is a form of local treatment. It is an operation or procedure to remove cancer from the body. Sometimes, surgery can be used as the main or primary treatment to remove cancer in the pancreas. This is only one part of a treatment plan.

Surgery can be used to:

- remove all of the tumor
- remove a section or debulk the tumor
- provide supportive care (relieve pain or discomfort)

NCCN experts recommend that surgery for pancreatic cancer should be done at a center that does at least 15 to 20 pancreatic surgeries each year. Hospitals that perform many pancreatic surgeries often have better results.

The type of surgery you receive depends on size and location of the tumor in the pancreas. It also depends on if there is cancer in any surrounding organs and tissues.

There are 2 types of surgery:

- Open surgery
- Minimally invasive surgery (laparoscopic or robotic surgery)

### Open surgery

Open surgery removes tissue through one large surgical cut below your ribs. The large cut lets your doctor directly view and access the tumor in your pancreas to remove it. Open surgery may take several hours or longer. After the surgery, you will need to stay in the hospital for several days or longer to recover.

### Minimally invasive surgery

Minimally invasive surgery uses a few small incisions or cuts instead of one large one. Small tools are inserted through each incision to perform the surgery. One of the tools, called a laparoscope, is a long tube with a video camera at the end. The camera lets your doctor see your pancreas and other tissues inside your abdomen. Other tools are used to remove the tumor. Laparoscopic surgery can also be done using robotic arms to control the surgical tools. This is called robot-assisted laparoscopic surgery.

### Tumor resection

Imaging tests will be ordered to see if your cancer is resectable (can be removed completely by surgery) or unresectable (cannot be removed by surgery). Sometimes, imaging tests cannot clearly show one way or the other. In this case, pancreatic cancer is called borderline resectable. In borderline resectable pancreatic cancer, the tumor involves nearby veins and arteries.

Tumors in the head or body of the pancreas are usually more advanced and are not resectable. Unresectable tumors also tend to be locally advanced or metastatic pancreatic cancer.

Cancer in the neck of the pancreas is a very difficult surgery. Find a surgeon who is experienced in this type of surgery if your cancer is in the neck of the pancreas.

## Surgery

- ✓ Pancreatic resections should be done at hospitals that perform at least 15 to 20 each year. This is known as a high-volume center.

Pancreatic surgery takes a great deal of skill. Hospitals that perform many pancreatic surgeries often have better results.

The goal of surgery or tumor resection is to remove all of the cancer. To do so, the tumor is removed along with some normal-looking tissue around its edge. The normal-looking tissue is called the surgical margin. A clear or negative margin (R0) is when no cancer cells are found in the tissue around the edge of the tumor. In a positive margin cancer cells are found in normal-looking tissue around the tumor. R0 is very difficult in pancreatic cancer. Even with an R0 resection, chance of cancer recurrence is high.

A negative margin (R0) is the best result. Your surgeon will look carefully for cancer not only along the surgical margin, but in other nearby areas. If your doctor does not feel a negative margin is possible, you might receive a systemic treatment before surgery called neoadjuvant therapy. Neoadjuvant therapy will help shrink the size of the tumor and the amount of cancer in the body.

There are 3 types of surgery used to treat pancreatic cancer:

- **Pancreaticoduodenectomy** - Surgery that removes the head of the pancreas, gallbladder, duodenum (first part of the small intestine), part of the bile duct, nearby lymph nodes, and often part of the stomach. This is known as a Whipple procedure. This surgery can be open or minimally invasive.
- **Distal pancreatectomy** – Surgery that removes the body and tail of the pancreas, and sometimes the entire spleen (splenectomy). This surgery can be open or minimally invasive.
- **Total pancreatectomy** – Surgery that removes the whole pancreas, part of the small intestine, part of the stomach, the common bile duct, the gallbladder, the spleen, and nearby lymph nodes. It is usually done as open surgery.

Your team will gather as much information as possible before surgery. Often, it is very hard to know until surgery how much cancer there is and if there is cancer in any veins, arteries, and other organs. Complex decisions must be made during surgery. Ask your surgeon what might be removed during surgery and what this means. Sometimes, a tumor will be found to be unresectable during surgery. At this time, a biopsy will be done if one was not done before. A biopsy will help with treatment options.

### Whipple procedure

If the tumor is in the head of your pancreas, you will have a pancreaticoduodenectomy (said pancreatico-duod-enectomy) or Whipple procedure. **See Figure 5.**

A Whipple procedure is surgery that removes the head of the pancreas, the gallbladder, duodenum (first part of the small intestine), part of the bile duct, and often part of the stomach. Lymph nodes near your pancreas will be removed to test for cancerous cells. Once the cancer has been removed, your surgeons will reconnect your organs so you can digest food. Possible life-threatening complications of this surgery are infection, pancreatic leaks, and fistulas (an opening between organs).

A Whipple procedure can be open or minimally invasive. It requires a great deal of skill. Blood vessels might have to be removed or pieces cut out and sewn back together. Parts of organs might have to be removed and sewn back together. All of the cancer must be removed in order to achieve a negative margin resection (R0). This might not be possible based on the type and stage of pancreatic cancer.

**Distal pancreatectomy**

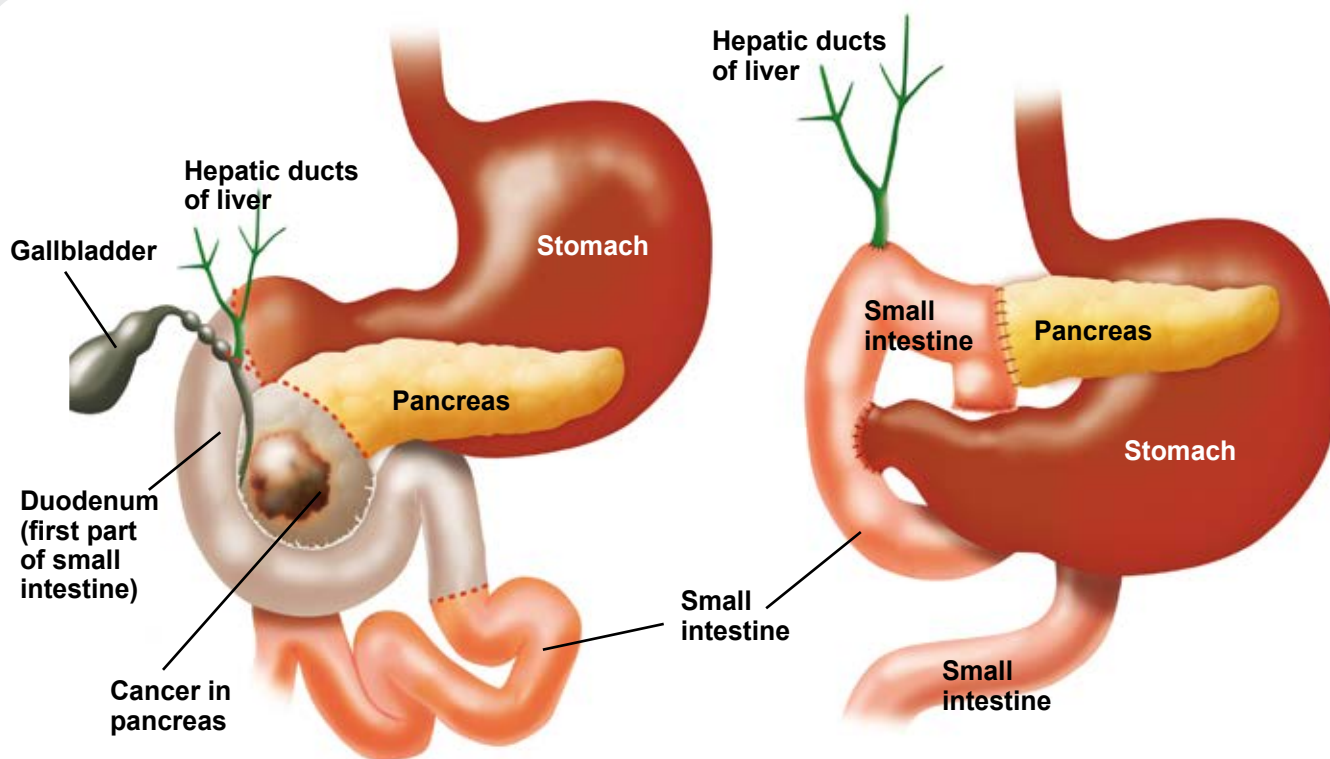
A distal pancreatectomy (said dis-tull pancre-uh-teck-toe-mee) is a surgery to remove the body and tail of the pancreas. It is possible the entire spleen will have to be removed (splenectomy) if there is cancer in the spleen or its vessels. Other blood vessels might have to be removed or pieces cut out and sewn back together. A distal pancreatectomy is used for a resectable-only tumor in the tail of the pancreas. Even with R0 resection, local recurrence is possible. This surgery is difficult because the cancer in this part of the pancreas is usually more advanced.

**Total pancreatectomy**

A total pancreatectomy removes the whole pancreas, part of the small intestine, part of the stomach, the common bile duct, the gallbladder, nearby lymph nodes, and the spleen (splenectomy). This surgery is rare. It is done when there are multiple tumors or there is cancer throughout the pancreas.

**Figure 5. Whipple procedure**

The image on the left shows cancer in the head of the pancreas. The image on the right shows how the organs might be reconnected during a Whipple procedure.





### Radiation therapy

Radiation therapy uses high-energy radiation from x-rays, gamma rays, protons, and other sources to kill cancer cells and shrink tumors. It is given over a certain period of time. It is a local form of treatment.

In pancreatic cancer, radiation therapy is used as supportive care to help ease discomfort or pain in locally advanced and metastatic pancreatic cancer. Radiation therapy can also be given before, during, or after surgery to treat or slow the growth of cancer. Radiation might be given with lower dose chemotherapy.

### Stereotactic body radiation therapy

Stereotactic body radiation therapy (SBRT) uses high-energy radiation beams to treat cancers. It is used as a treatment option for locally advanced pancreatic cancer and for cancer that has returned after surgery (recurrence).

SBRT may be used to:

- Relieve symptoms such as pain caused by pancreatic cancer metastases
- Treat pancreatic cancer in patients who cannot have surgery as a primary treatment due to other health conditions
- Shrink tumors
- Prevent recurrence

SBRT uses a machine to aim radiation beams at tumors in the body. With this method you will receive high-dose radiation for 1 to 5 treatments. SBRT is very precise, and thereby reduces the chance of damage to nearby tissues.

## Systemic treatments

A cancer treatment that affects the whole body is called systemic therapy. Chemotherapy used to be the most common type of systemic therapy. Now, there are other cancer treatments like targeted therapy and immunotherapy. Each works differently to shrink the tumor and prevent recurrence. Systemic treatments may be used alone or together.

Systemic therapies that might be used include:

- **Chemotherapy** – attacks rapidly dividing cells in the body
- **Targeted therapy** – focuses on specific or unique feature of cancer cells
- **Immunotherapy** – uses your body's natural defenses to find and destroy cancer cells

Often, more than one drug is used to treat cancer. This gives you a better chance of getting rid of the cancer, but it also puts healthy cells at risk for damage. Cell damage can lead to harmful side effects. In some cases, you may have to stop or delay treatment. Your doctor may change the systemic treatment approach or lower the dosage. Ask your doctor about the goal of systematic therapy for your stage of pancreatic cancer. Be clear about your wishes.

Systemic therapy is an option for all stages of pancreatic cancer. A biopsy is needed before treatment can start. Systemic therapy for pancreatic cancer can be given as a pill taken by mouth or as a liquid that is slowly injected into a vein called an infusion. You might go home with an infusion pump that will give a continuous infusion of systemic therapy over a longer period of time.





### Chemotherapy

Chemotherapy is the use of drugs to treat cancer. All chemotherapy drugs affect the instructions (genes) that tell cancer cells how and when to grow and divide. Chemotherapy kills fast-growing cells throughout the body, including cancer cells and normal cells.

Chemotherapy is given in cycles of treatment days followed by days of rest. Cycles vary in length depending on which drugs are used. You will have tests before starting chemotherapy and during chemotherapy to see how well the treatment is working.



### Targeted therapy

Targeted therapy is a form of systemic treatment that works throughout your body. It is treatment with drugs that focus on or target a specific or unique feature of cancer cells.

Targeted therapies seek out how cancer cells grow, divide, and move in the body. These drugs stop the action of molecules that help cancer cells grow. As a result, targeted therapies are less likely to damage healthy cells or cause side effects. Targeted therapies might be in pill form or given through a vein or IV (intravenous). Targeted therapy can be given alone or with other types of treatment.



### Immunotherapy

The immune system is the body's natural defense against infection and disease. It is a complex network of cells, tissues, and organs. The immune system includes many chemicals and proteins. These chemicals and proteins are made naturally in your body.

Immunotherapy is a type of systemic treatment that increases the activity of your immune system. By doing so, it improves your body's ability to find and destroy cancer cells. Immunotherapy can be given alone or with other types of treatment. It is usually given as an infusion.



### Chemoradiation

Treatment that combines chemotherapy with radiation therapy is called chemoradiation. Chemotherapy may improve how well radiation works, and that is why they are sometimes used together. It is a combination of systemic and local therapies.

## Did you know?

The terms “chemotherapy” and “systemic therapy” are often used interchangeably, but they are not the same. Chemotherapy, targeted therapy, and immunotherapy are all types of systemic therapy.

## Clinical trials

Clinical trials study how safe and helpful tests and treatments are for people. Clinical trials find out how to prevent, diagnose, and treat a disease like cancer. Because of clinical trials, doctors find safe and helpful ways to improve your care and treatment of pancreatic cancer.

Clinical trials have 4 phases.

- **Phase I** trials aim to find the safest and best dose of a new drug. Another aim is to find the best way to give the drug with the fewest side effects.
- **Phase II** trials assess if a drug works for a specific type of cancer.
- **Phase III** trials compare a new drug to a standard treatment.
- **Phase IV** trials test drugs approved by the U.S. FDA (Food and Drug Administration) to learn more about side effects with long-term use.

To join a clinical trial, you must meet the conditions of the study. Patients in a clinical trial are often alike in terms of their cancer and general health. This helps ensure that any change is from the treatment and not because of differences between patients.

If you decide to join a clinical trial, you will need to review and sign a paper called an informed consent form. This form describes the study in detail, including the risks and benefits. Even after you sign a consent form, you can stop taking part in a clinical trial at any time.

Ask your treatment team if there is an open clinical trial that you can join. There may be clinical trials where you're getting treatment or at other treatment centers nearby. Discuss the risks and benefits of joining a clinical trial with your care team. Together, decide if a clinical trial is right for you.

NCCN experts encourage patients to join a clinical trial, when possible.



### Finding a clinical trial

- Search the National Institutes of Health (NIH) database for clinical trials. It includes publicly and privately funded clinical trials, who to contact, and how to enroll. Look for an open clinical trial for your specific type of cancer. Go to [ClinicalTrials.gov](https://clinicaltrials.gov).
- The National Cancer Institute's Cancer Information Service (CIS) provides up-to-date information on clinical trials. You can call, e-mail, or chat live. Call 1.800.4.CANCER (800.422.6237) or go to [cancer.gov](https://cancer.gov).

## Treatment team

Treating pancreatic cancer takes a team approach. NCCN recommends that treatment decisions involve a multidisciplinary team or a team of doctors from different fields of medicine. Some members of your care team will be with you throughout your entire cancer treatment, while others will only be there for parts of it. Get to know your care team and let them get to know you.

- **Your primary care doctor** handles medical care not related to your cancer. This person can help you express your feelings about treatments to your cancer care team.
- **A gastroenterologist** is an expert in diseases of the digestive system and an expert in endoscopic procedures for diagnostic, therapeutic, or palliative purposes.
- **A medical oncologist** treats cancer in adults using systemic therapy. Often, this person will lead the overall treatment team and keep track of tests and exams done by other specialists.
- **Oncology nurses** provide your hands-on care, like giving systemic therapy, managing your care, answering questions, and helping you cope with side effects.

Depending on your diagnosis, your team might include:

- **An anesthesiologist** who gives anesthesia, a medicine so you do not feel pain during surgery or procedures
- **A diagnostic radiologist** who reads the results of x-rays and other imaging tests

- **A dietitian or nutritionist** who gives nutritional advice and helps you plan menus to meet your nutritional needs during cancer treatment
- **A pathologist** who reads tests and studies the cells, tissues, and organs removed during a biopsy or surgery
- **A radiation oncologist** who prescribes and plans radiation therapy to treat cancer and provide palliative care
- **A surgical oncologist** who performs operations to remove cancer

You know your body better than anyone. Help other team members understand:

- How you feel
- What you need
- What is working and what is not

Keep a list of names and contact information for each member of your team. This will make it easier for you and anyone involved in your care to know who to contact with questions or concerns.

Get to know your care team and let them get to know you.

## Review

- Surgery removes the tumor along with some normal-looking tissue around its edge called a surgical margin.
- The goal of surgery (tumor resection) is a negative margin (R0).
- Radiation kills cancer cells or stops new cancer cells from being made.
- Systemic therapy is used in all stages of pancreatic cancer.
- A clinical trial is a type of research that studies a treatment to see how safe it is and how well it works. Sometimes, a clinical trial is the preferred treatment option for pancreatic cancer.

## Order of treatments

Most people with pancreatic cancer will receive more than one type of treatment. Next is an overview of the order of treatments and what they do.

- **Neoadjuvant (before)** treatment is given to shrink the tumor before primary treatment (surgery). This might change a borderline resectable tumor into a resectable tumor.
- **Primary treatment** is the main treatment given to rid the body of cancer. Surgery is usually the main treatment for resectable pancreatic cancer.
- **Adjuvant (after) treatment** is given after primary treatment to rid the body of any cancer cells left behind from surgery. It is also used when the risk of cancer returning (recurrence) is felt to be high.
- **First-line treatment** is the first set of treatments given.
- **Second-line treatment** is the next set of treatments given after the first treatment has failed.

Talk to your doctor about your treatment plan and what it means for your stage of pancreatic cancer.

# 4

## Supportive and palliative care

- 36 Blocked bile duct
- 36 Blocked stomach
- 37 Pain
- 38 Depression
- 38 Trouble eating
- 38 Pancreatic exocrine insufficiency
- 39 Advance care planning
- 39 Review



**Supportive care is health care that relieves your symptoms caused by cancer and improves your quality of life.**

Supportive care is treatment given to relieve symptoms caused by pancreatic cancer or cancer treatment. It is also referred to as palliative care. Supportive care is an important part of care for pancreatic cancer. Don't be afraid to ask for it.

Supportive care is not cancer treatment. It might include pain relief (palliative care), emotional or spiritual support, financial aid, or family counseling. Pancreatic cancer can make it difficult to eat or digest food. Tell your care team how you are feeling and about any side effects.

Best supportive care is used with other treatments to improve quality of life for those with locally advanced and metastatic pancreatic cancer. It is also used when there is cancer recurrence after surgery. Best supportive care, supportive care, and palliative care are often used interchangeably.

## Blocked bile duct

A tumor in the pancreas may grow large enough to block your bile duct. A bile duct is a small tube that drains digestive fluid (bile) from the liver. The common bile duct carries bile from the liver through the pancreas and into the first part of the small intestine (duodenum). A blocked duct causes bile to build up in the liver. As a result, you may have pain, itching, discomfort, and jaundice. This blockage can cause an infection of the bile duct called cholangitis.

A blocked bile duct may be treated by placing a biliary stent or doing a biliary bypass. A biliary stent is a tiny tube that is placed in the bile duct to unblock it or keep it open. Before the stent can be placed, bile may need to be drained through an opening in the side of the body. You may need a new or second stent during or after cancer treatment if the tumor grows. A biliary bypass is a surgery to re-route the flow of bile from the common bile duct into the small intestine. The result is that the bile flow avoids (bypasses) the blocked part of the duct.

## Blocked stomach

A tumor in the pancreas may also grow large enough to block food from passing out of your stomach through the first part of the small intestine (duodenum). This blockage can cause pain, vomiting, weight loss, and other problems. Treatments for a blocked stomach include a stent, a PEG (percutaneous endoscopic gastrostomy) tube, or a stomach-duodenum bypass (gastrojejunostomy).

A stent is a tube that expands. It is placed in the small intestine to keep your stomach open so food can pass through. A PEG tube is a tube that is inserted through a cut in the abdomen and placed in the stomach. Food is given through this tube. A gastrojejunostomy is a surgery to re-route the path food takes from the stomach into the small intestine. The new path from the stomach will avoid (bypass) the blocked part of the duodenum. This surgery may also be done as a preventive measure if there is a high risk that your stomach may become blocked.

## Pain

Pain is common in those with locally advanced unresectable and metastatic pancreatic cancer. Severe abdominal pain can occur when the tumor grows into nearby nerves or presses against other organs. This pain is treated with around-the-clock medicine such as morphine or other opioids.

When severe abdominal pain no longer responds to pain medicine or the medicine is causing side effects, there are 2 options:

- EUS-guided celiac plexus neurolysis
- Palliative radiation with or without systemic therapy

An EUS-guided celiac plexus neurolysis is a nerve block. It uses an endoscope to place a needle into the stomach. An injection is given to the nerves that transmit pain from the pancreas to the brain. This blocks the pain.

Some patients may benefit from palliative radiation therapy, with or without systemic therapy, to help relieve the pain. During this treatment, a radiation beam is focused on the tumor. **See Figure 6.**

Ask questions and seek information about supportive and palliative care options for your pain.

### Figure 6. Radiation therapy

Radiation therapy uses high-energy radiation from x-rays, gamma rays, protons, and other sources to kill cancer cells and shrink tumors. It is also used to treat pain.



## Depression

Depression, anxiety, and sleeping problems are common in pancreatic cancer. Talk to your doctor and with those whom you feel most comfortable about how you are feeling. There are services and people who can help you. Support and counseling are available. It is recommended that all patients be screened for depression.



For more information about depression, read the *NCCN Guidelines for Patients®: Distress*, available at [www.nccn.org/patients](http://www.nccn.org/patients).

## Trouble eating

Sometimes side effects from surgery, pancreatic cancer, or its treatment might cause you to feel not hungry or sick to your stomach (nauseated). You might have abdominal cramps or trouble digesting food. Healthy eating is important during treatment. It includes eating a balanced diet, eating the right amount of food, and drinking enough fluids. A registered dietitian who is an expert in nutrition and food can help. Speak to your care team if you have trouble eating.

## Supportive care

- ✓ Supportive care is given at any stage of cancer. Ask for it!

Supportive care relieves symptoms of cancer and side effects caused by its treatment.

## Pancreatic exocrine insufficiency

There are two changes to your pancreas after surgery that may require you to change your diet.

- There are less digestive enzymes to break down food.
- There are less chemicals to control sugar (insulin and glucagon).

Pancreatic enzyme replacement medicine, usually a pill taken by mouth, is given to replace the loss of digestive enzymes. This loss can be caused by surgery, a blocked duct, or from the tumor. You will have trouble digesting food without enough of these enzymes. Ask your doctor how surgery might affect your ability to digest food.



## Advance care planning

Advance care planning is making decisions now about the care you would want to be treated if you become unable to speak for yourself. Advance care planning is for everyone, not just for those who are very sick. It is a way to ensure your wishes are understood and respected.

Advance care planning starts with an honest discussion with your doctor. Ask your doctor about the course your cancer will take called a cancer prognosis. Find out what you might expect if your cancer spreads. Discuss the medicines or therapies that will give you the best quality of life. Include family and friends in your advance care planning. Make your wishes clear. It is important that everyone understands what you want.

You don't have to know the exact details of your prognosis. Just having a general idea will help with planning. With this information, you can decide if there is a point you might want to stop cancer treatment. You can also decide what treatments you would want for symptom relief, such as radiation therapy, surgery, or medicine.

You can change your advance care plan at any time. It might be helpful to have this talk with your doctor and/or friends and family more than once during your treatment. Making your wishes clear will ensure everyone knows what you want.

## Review

- Supportive care is treatment given to relieve symptoms of cancer and the side effects of cancer treatment.
- A stent is a tiny tube that may be used to unblock a bile duct or the stomach.
- Pain may be treated with medication, a nerve block, or radiation with or without systemic therapy.
- A registered dietitian who is an expert in nutrition and food can help if it is hard for you to eat or digest food.
- Advance care planning starts with an honest talk between you and your doctor.

# 5

## Treatment guide: Resectable

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41 Before surgery

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43 Surgery

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44 After surgery

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46 Recurrence

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48 Review



This chapter will guide you through treatment options for cancer that is found only in the pancreas and can be removed completely with surgery. Together, you and your doctor should choose a treatment plan that is best for you.

### Before surgery

Surgery is the primary treatment for resectable pancreatic cancer. Often, neoadjuvant therapy is given before surgery to help shrink the tumor. If you and your doctor are considering



neoadjuvant therapy, treatment at a hospital that specializes in pancreatic cancer is preferred, when possible.

There are 2 treatment options for resectable cancer:




- Surgery, [see Guide 6](#).
- Neoadjuvant therapy before surgery, [see Guide 7](#).

You might have a test called a staging laparoscopy. It is used to make sure there are no metastases in your abdomen. Your doctor may consider this test if you are at higher risk of having metastases.

#### Guide 6. Resectable cancer with surgery option

Staging		Surgery		Result
Staging laparoscopy (as needed)		Surgery to remove (resect) tumor		Unable to remove tumor during surgery. Tumor is unresectable.
				Tumor removed (see <a href="#">Guide 9</a> )

#### Guide 7. Resectable cancer with neoadjuvant therapy before surgery

Staging		Treatment		Tests before surgery		Surgery	Result
<ul style="list-style-type: none"> <li>• Staging laparoscopy (as needed)</li> <li>• EUS-guided core biopsy</li> </ul>		Neo-adjuvant therapy		<ul style="list-style-type: none"> <li>• Repeat pancreatic protocol CT or MRI</li> <li>• Repeat chest CT</li> <li>• Repeat pelvic CT</li> <li>• Repeat CA 19-9</li> <li>• Stent (as needed)</li> </ul>		Surgery to resect tumor	Unable to remove tumor during surgery. Tumor is unresectable.
							Tumor removed (see <a href="#">Guide 9</a> )

### Neoadjuvant treatment

An EUS-guided core biopsy is recommended before starting neoadjuvant therapy. A core biopsy removes a larger sample of tissue using a wide, hollow needle. In addition, a staging laparoscopy might be done. After the biopsy results, you will begin neoadjuvant treatment. Neoadjuvant treatment options are found in [Guide 8](#).

The preferred neoadjuvant therapy options are:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with albumin-bound paclitaxel
- Treatment might be followed by chemoradiation

There are different options if your tumor has a *BRCA1*, *BRCA2*, or *PALB2* mutation.

Once neoadjuvant treatment is complete, imaging tests will be repeated to see if there was any change in tumor size.

They include:

- Pancreatic protocol CT or MRI
- Chest CT
- Pelvic CT
- CA 19-9

When you have surgery to remove (resect) the tumor, what happens next will be based on whether or not the tumor was removed during surgery.

## Guide 8. Neoadjuvant systemic therapy options for resectable cancer

### Preferred options

One of the following:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with albumin-bound paclitaxel
- Treatment might be followed by chemoradiation

For *BRCA1*, *BRCA2*, or *PALB2* mutations only

One of the following:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with cisplatin
- Treatment might be followed by chemoradiation

## Surgery

Surgery is the primary treatment for resectable pancreatic cancer. Primary treatment refers to the first or main treatment used to treat cancer. Sometimes, treatment is given before surgery. This is called neoadjuvant therapy.

A team of doctors will need to agree that surgery is the best choice in your case. When deciding if surgery is possible, your doctor should work with a team of experts at a hospital that does more than 15 to 20 pancreatic cancer surgeries each year. This is a high-volume center.

Pancreatic surgery is complex. The tumor might have grown into veins and arteries in such a way that makes it unsafe to remove. If your doctor finds that your tumor cannot be removed during surgery, your resectable pancreatic cancer is now called unresectable.

### **Cancer found unresectable**

For cancer that cannot be removed by surgery, treatment is first based on if there is or isn't jaundice and then how far the cancer has spread.

If there isn't jaundice, treatment may include a

- Gastrojejunostomy and/or
- Celiac plexus neurolysis

If there is jaundice, treatment may include a

- Biliary bypass or stent and/or
- Gastrojejunostomy and/or
- Celiac plexus neurolysis

In a duodenal bypass (gastrojejunostomy), a path is created between the stomach and the middle section of the small intestine. It may be done if cancer is blocking the stomach or the first part of the small intestine (duodenum). The new path from the stomach will avoid (bypass) the blocked part of the duodenum. This surgery may be used as a preventive measure if there is a high risk that your stomach may become blocked.

If you have or are at risk of developing jaundice, you might have a biliary bypass to re-route the flow of bile around the blocked part of the bile duct. A stent might be placed if you have a blocked bile duct.

If you have severe pain, the surgeon may also inject alcohol (ethanol) into the nerves in the abdomen (called celiac plexus) to destroy them to relieve the pain. This is a nerve block referred to as celiac plexus neurolysis.

## After surgery

Adjuvant therapy is treatment given after surgery to rid the body of cancer cells and to help prevent recurrence. If surgery is successful and all of the cancer can be removed, you will have more treatment to try to kill any remaining cancer cells. The tests and treatments recommended after surgery for resectable pancreatic cancer are found in [Guide 9](#).

### Tests before adjuvant treatment

Before beginning adjuvant treatment, you will have a CA 19-9 blood test and CT scan with contrast of the chest, pelvis, and abdomen. These tests are done to check for signs of recurrence and metastasis. You will have germline testing if it hasn't been done before.

If the tests do not show any signs of metastases or recurrence, then you will receive adjuvant treatment. Adjuvant treatment should only be started after you've fully recovered from surgery.

## Guide 9. Adjuvant treatment options after surgery

Baseline tests		Metastases		Neoadjuvant therapy		Treatment options
<ul style="list-style-type: none"> <li>• CT of chest, abdomen, and pelvis</li> <li>• CA 19-9</li> <li>• Germline testing (if not done before)</li> </ul>	➡	No metastases or recurrence	➡	No, I didn't have neoadjuvant therapy before surgery	➡	One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy (see <a href="#">Guide 10</a>)</li> <li>• Systemic therapy followed by chemoradiation with or without more systemic therapy</li> </ul>
	➡	No metastases or recurrence	➡	Yes, I had neoadjuvant therapy before surgery	➡	Consider more systemic therapy
	➡	Yes, there are metastases (see <a href="#">Guide 18</a> )				

Note: Imaging tests should be done with contrast material, when possible.

### Adjuvant treatment

There are 3 main adjuvant treatment options for resectable pancreatic cancer:

- Clinical trial (preferred)
- Systemic therapy
- Systemic therapy followed by chemoradiation

Adjuvant systemic therapy options are listed in [Guide 10](#). There are several options, but only two that are preferred. Preferred drugs have the best result with fewer side effects. The type of therapy you receive will be based on if you had neoadjuvant therapy and, if so, how you responded to that neoadjuvant therapy.

If you had neoadjuvant therapy, the preferred systemic therapy options are:

- Gemcitabine with capecitabine
- Modified FOLFIRINOX

### Follow-up tests

After completing adjuvant treatment, you will have follow-up tests. Follow-up tests are given to see how well treatment worked. These tests look for signs of cancer return (recurrence) or spread (metastasis) after treatment.

Follow-up tests are recommended every 3 to 6 months for 2 years, and then once every 6 to 12 months as needed. This period of time is called surveillance. It is how your doctor will check for recurrence or metastasis. A medical history and physical exam can help to find signs and symptoms of recurrent pancreatic cancer early.

Tests as needed include:

- Medical history
- Physical exam
- CA 19-9
- CT of chest
- CT of MRI of abdomen and pelvis

## Guide 10. Adjuvant systemic therapy options

Preferred options	Other options (if you did not have neoadjuvant therapy)
<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine with capecitabine</li> <li>• Modified FOLFIRINOX</li> </ul>	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• 5-FU with leucovorin</li> <li>• Continuous infusion 5-FU</li> <li>• Capecitabine</li> <li>• Systemic therapy followed by chemoradiation</li> <li>• Systemic therapy followed by chemoradiation followed by more rounds of therapy and chemoradiation</li> </ul>

## Recurrence





### Tests

First, you may have a biopsy to confirm return (recurrence) of pancreatic cancer. Based on tests, your doctors will know how far the cancer has spread. Cancer that came back in or near the pancreas is called a local recurrence. Cancer that has spread to sites far away from the pancreas is called metastatic cancer.

### Treatment

When there is a recurrence of pancreatic cancer after surgery with adjuvant therapy, treatment is based on whether the recurrence is local or metastatic. Joining a clinical trial is the preferred treatment choice in both local and metastatic recurrence. [See Guide 11.](#)

## Guide 11. Therapy options for cancer recurrence after resection surgery

Cancer			Recurrence therapy options
<b>Local recurrence</b> (might need biopsy to confirm cancer)	Pancreas only		<ul style="list-style-type: none"> <li>• Surgery may be possible. A team of doctors should agree on a treatment plan.</li> </ul>
	Pancreas and area nearby		One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy</li> <li>• Systemic therapy with chemoradiation</li> <li>• Systemic therapy with SBRT (if not done before)</li> <li>• SBRT</li> <li>• Palliative and best supportive care</li> </ul>
<b>Metastatic with or without local recurrence</b> (might need biopsy to confirm cancer)	It's been 6 months or more since systemic therapy ended		One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Repeat systemic therapy used before</li> <li>• Systemic therapy not used before</li> <li>• Palliative and best supportive care</li> </ul>
	It's been less than 6 months since systemic therapy ended		One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Gemcitabine-based systemic therapy (if fluoropyrimidine-based used before)</li> <li>• Fluoropyrimidine-based systemic therapy (if gemcitabine-based used before)</li> <li>• Palliative and best supportive care</li> </ul>



Best supportive care without active cancer treatment should also be considered.

Supportive care, also called palliative care, is treatment to relieve the symptoms of cancer and side effects of cancer treatment. Other treatment options for recurrence depend on how far the cancer has spread.

### Local recurrence

For a local recurrence, surgery may be possible if the cancer is found only in the pancreas. A team of doctors will need to agree that surgery is the best choice in your case.

Options for local recurrence in the pancreas and nearby area are:

- Clinical trial (preferred)
- Systemic therapy
- Systemic therapy with chemoradiation
- Systemic therapy with SBRT, if not done before
- SBRT
- Palliative and best supportive care

### Metastatic recurrence

For metastatic cancer, recurrence therapy options depend on how long it has been since your last treatment was completed.

If cancer recurrence is **6 months or more** since systemic therapy ended, then your options are:

- Clinical trial (preferred)
- Repeating a systemic therapy used before
- Trying a different systemic therapy than what was used before
- Palliative and best supportive care

If cancer recurrence is **less than 6 months** since systemic therapy ended, then your options are:

- Clinical trial (preferred)
- Try a different systemic therapy than what you had before
- Palliative and best supportive care

## Review

- In resectable pancreatic cancer, surgery is used as the primary treatment to remove the tumor. You might have neoadjuvant therapy before surgery to shrink the tumor and reduce the amount of cancer cells.
- If the tumor was removed (resected) during surgery, then you will have adjuvant therapy to rid the body of cancer cells and to help prevent recurrence.
- If your surgeon was unable to remove your tumor, it is now called unresectable. Biopsies and other tests will be done to see if the cancer is locally advanced or metastatic.
- After finishing adjuvant therapy, you will go through follow-up testing and enter a period of time called surveillance.
- If your cancer returns (recurrence) after you had surgery, treatment will be based on how far the cancer has spread and how long it has been since adjuvant therapy ended.

A preferred treatment has the best result and fewer side effects.

# 6

## Treatment guide: Borderline resectable

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This chapter will guide you through treatment for cancer that is found in the pancreas and might involve nearby veins and arteries. Together, you and your doctor should choose a treatment plan that is best for you.

In borderline resectable cancer, the cancer is found only in the pancreas but might involve nearby blood vessels or structures. When the tumor is wrapped around part of the hepatic artery, superior mesenteric artery, or superior mesenteric vein, and there is risk for a positive margin, then surgery might not be the best option.

Surgery should only be used as primary treatment if a team of doctors agree the cancer can be completely removed with surgery.

For borderline resectable cancer, your doctor may plan to give you treatment before surgery called neoadjuvant therapy. The goal of neoadjuvant therapy is to try to shrink the tumor in order make it easier to remove during surgery.

### Tests

Consider testing at a hospital or cancer center that treats more than 15 to 20 people with pancreatic cancer each year. Tests for borderline resectable pancreatic cancer with no metastases can be found in [Guide 12](#).

Treatment cannot start without a biopsy to confirm cancer. There is more than one type of biopsy. In this case, an EUS-FNA biopsy is

### Guide 12. Tests for borderline resectable cancer with no metastases

Tests	Is it cancer?		Next steps		Result	
<ul style="list-style-type: none"> <li>• Biopsy (EUS-FNA preferred)</li> <li>• Core biopsy recommended</li> <li>• Consider staging laparoscopy</li> <li>• Baseline CA 19-9</li> </ul>	Yes	➔	<ul style="list-style-type: none"> <li>• Pancreatic protocol CT or MRI of abdomen</li> <li>• Chest and pelvic CT</li> <li>• CA 19-9</li> </ul>	➔	<ul style="list-style-type: none"> <li>• Surgery</li> <li>• Consider staging laparoscopy (if not done before)</li> </ul>	Tumor removed (see <a href="#">Guide 9</a> )
					<ul style="list-style-type: none"> <li>• Surgery is not an option</li> <li>• Cancer is spreading</li> </ul>	Tumor not removed (see below)
	No	➔	Cancer confirmed (follow above)			Locally advanced (see <a href="#">Guide 13</a> )
			Cancer not confirmed (rule out auto-immune pancreatitis)	➔	Follow-up at a high-volume center	

preferred and a core biopsy is recommended. A core biopsy removes a larger sample of tissue using a wide, hollow needle.

If the first biopsy doesn't confirm cancer, then a repeat biopsy must be done. Neoadjuvant treatment isn't recommended until a cancer diagnosis is confirmed by biopsy.

Your doctor may also do a staging laparoscopy to make sure there are no metastases in your abdomen that didn't show up on other imaging tests. This is considered if you are at higher risk of having metastases. If the cancer is blocking a bile duct, then a stent using ERCP will be placed to unblock it.

After neoadjuvant treatment is started, then the following tests will be done:

- CA 19-9
- Pancreatic protocol CT or MRI of abdomen
- Chest and pelvic CT

These tests will show how the tumor is responding to treatment. If test results show the cancer is shrinking, then surgery might be an option. A staging laparoscopy is recommended (if not done already) before surgery. Treatment after surgery (adjuvant therapy) will be based on whether or not the tumor was removed (resected).

## Neoadjuvant treatment

Once a biopsy confirms pancreatic cancer, then you will begin neoadjuvant treatment. The goal of neoadjuvant treatment is to shrink the cancer so all of the cancer can be removed with surgery. The neoadjuvant options might be followed by chemoradiation.

Preferred neoadjuvant options include:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with albumin-bound paclitaxel
- Treatment might be followed by chemoradiation

Neoadjuvant systemic therapy options will be different if you have a *BRCA1*, *BRCA2*, or *PALB2* mutation. Germline testing will show if you have any of these mutations. Germline testing is recommended for anyone with confirmed pancreatic cancer.

Preferred neoadjuvant options for *BRCA1*, *BRCA2*, or *PALB2* mutations include:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with cisplatin
- Treatment might be followed by chemoradiation

## Surgery

If the follow-up tests don't show any signs of cancer growth or spread, then you will proceed with an operation to remove the tumor.

During surgery, your doctor may find that the cancer has spread too far and cannot be fully removed. In this case, surgery can't be completed. While you are in the operating room, the doctor may still perform a biliary bypass procedure and/or a duodenal bypass to prevent your tumor from causing jaundice or intestinal obstruction in the future. Your doctor may also do a nerve block to relieve severe pain.

Adjuvant treatment will depend on how far the cancer has spread. Cancer that involves nearby blood vessels or other structures that prevent it from being completely removed with surgery is called locally advanced unresectable pancreatic cancer. Cancer that has spread outside the pancreas to distant sites in the body is called metastatic pancreatic cancer.

## Adjuvant treatment

Treatment for borderline resectable cancer will be based on the following:

- Tumor was removed (see Guide 10)
- Tumor was not removed (see below)
- Tumor was not removed because it is locally advanced (see Guide 13)
- Tumor was not removed because it is metastatic (see Guide 18)

## Review

- Surgery should only be used as primary treatment if a team of doctors agree the cancer can be completely removed with surgery.
- If you have a borderline resectable pancreatic cancer, you might have neoadjuvant treatment before surgery. Neoadjuvant treatment might be followed by chemoradiation.
- Once a biopsy confirms pancreatic cancer, then you will begin neoadjuvant treatment.
- After neoadjuvant therapy, if the tumor has shrunk, you might have surgery to remove the tumor.
- Adjuvant treatment is based on whether the tumor was removed during surgery.

# 7

## Treatment guide: Locally advanced

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This chapter will guide you through treatment options for cancer that has spread outside the pancreas to nearby blood vessels or other tissues. Together, you and your doctor should choose a treatment plan that is best for you.

## Tests

Before beginning cancer treatment, a biopsy is needed to confirm pancreatic cancer if not done before. If a biopsy confirms pancreatic cancer, then the next step is to treat symptoms, such as jaundice, caused by the cancer. Tests that are recommended for locally advanced pancreatic cancer are found in [Guide 13](#).

A tumor can cause jaundice by blocking a duct that drains bile and bilirubin from the liver. If you have jaundice, then a stent will be placed in the bile duct using ERCP. This will relieve the blockage in your bile duct. When placing the biliary stent, your doctor may also take samples (called brushings) of the duct to test for cancer.

- If the first biopsy doesn't confirm pancreatic cancer, then another biopsy will be done to try to confirm pancreatic cancer.
- If another type of cancer is found on biopsy, seek treatment for that type of cancer. Find more information at NCCN Guidelines for Patients® at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines).

After confirming pancreatic cancer with a biopsy and treating jaundice, cancer treatment can begin.

## First-line therapy

First-line therapy is the first treatment or set of treatments given to control the cancer. It is based on your performance status (PS). Your PS is a rating by your doctor based on your overall health, cancer symptoms, and ability to do daily activities. Good PS is usually PS 0 or PS 1. Poor PS is PS 2, PS 3, or PS 4. The goal of treatment for locally advanced pancreatic cancer is to stop the cancer from growing and spreading. [See Guide 14](#).

### Good PS

First-line therapy options for good PS include one from the list below:

- Clinical trial (preferred)
- Systemic therapy
- Chemoradiation
- SBRT

### Poor PS

First-line therapy options for poor PS include palliative and best supportive care with:

- Systemic therapy or
- Palliative radiation therapy

### Chemoradiation

If your first-line treatment is chemoradiation, the options for those with good PS are:

- Capecitabine with radiation therapy (preferred)
- Continuous infusion 5-FU with radiation therapy (preferred)
- Gemcitabine with radiation therapy



## Guide 13. Tests for locally advanced cancer

Biopsy	Cancer		Next tests		Result		What's next
Biopsy to confirm cancer (if not done before)	Pancreatic cancer confirmed	➔	If not done before	➔	If jaundiced, then self-expanding metal stent using ERCP	➔	see <a href="#">Guide 14</a>
			<ul style="list-style-type: none"> <li>• Germline testing</li> <li>• Gene testing</li> </ul>				
	Cancer not confirmed	➔	If needed	➔	Pancreatic cancer confirmed	➔	see <a href="#">Guide 14</a>
			<ul style="list-style-type: none"> <li>• MSI testing</li> <li>• MMR testing</li> </ul>		Cancer not confirmed		Follow-up at high-volume center
<ul style="list-style-type: none"> <li>• Repeat biopsy</li> <li>• If jaundiced, then ERCP with stent</li> </ul>			Other cancer confirmed		See below		
Other cancer confirmed	➔	See NCCN Guidelines for Patients® at <a href="https://www.nccn.org/patientguidelines">NCCN.org/patientguidelines</a>					

## Guide 14. First-line therapy options for locally advanced cancer

Good performance status	Poor performance status
<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy (see <a href="#">Guide 15</a>)</li> <li>• Chemotherapy for 4 to 6 months followed by chemoradiation</li> <li>• Chemotherapy for 4 to 6 months followed by SBRT</li> <li>• Chemoradiation</li> <li>• SBRT</li> </ul>	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Palliative and best supportive care with systemic therapy (see <a href="#">Guide 15</a>)</li> <li>• Palliative and best supportive care with palliative radiation therapy</li> </ul>

Note: Imaging tests might be done to see how cancer is responding to treatment.

First-line systemic therapy options for locally advanced pancreatic cancer are based on performance status (PS). Preferred treatments have the best result with fewer side effects. See Guide 15.

### Good PS

Preferred first-line systemic therapy options:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with albumin-bound paclitaxel

## Guide 15. First-line systemic therapy options for locally advanced cancer

Options	Good performance status	Poor performance status
<b>Preferred</b>	One of the following: <ul style="list-style-type: none"> <li>• FOLFIRINOX</li> <li>• Modified FOLFIRINOX</li> <li>• Gemcitabine with albumin-bound paclitaxel</li> </ul>	One of the following: <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>
	For <i>BRCA1</i> , <i>BRCA2</i> , or <i>PALB2</i> mutations only One of the following: <ul style="list-style-type: none"> <li>• FOLFIRINOX</li> <li>• Modified FOLFIRINOX</li> <li>• Gemcitabine with cisplatin</li> <li>• Consider olaparib</li> </ul>	
<b>Other</b>	One of the following: <ul style="list-style-type: none"> <li>• Gemcitabine with erlotinib</li> <li>• Gemcitabine with capecitabine</li> <li>• Gemcitabine</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> <li>• Fixed-dose-rate gemcitabine with docetaxel and capecitabine (GTX)</li> <li>• Oxaliplatin with 5-FU and leucovorin (OFF)</li> <li>• Capecitabine with oxaliplatin (CapeOx)</li> </ul>	—
<b>Used only in some cases</b>	One of the following: <ul style="list-style-type: none"> <li>• Systemic therapy followed by chemoradiation</li> <li>• Systemic therapy followed by SBRT</li> <li>• Chemoradiation</li> <li>• SBRT</li> </ul>	—

Preferred first-line options for good PS will be different if you have a *BRCA1*, *BRCA2*, or *PALB2* mutation. Germline testing will show if you have any of these mutations. Germline testing is recommended for anyone with confirmed pancreatic cancer.

### Poor PS

Preferred first-line systemic therapy options:

- Gemcitabine
- Capecitabine
- Continuous infusion 5-FU

## Second-line therapy

When first-line treatment does not stop the growth or spread of cancer, then a second treatment might be an option. Second-line therapy is the next set of treatments given when the first or previous treatments failed to stop cancer growth. Treatment options are based on your PS. In the case of good PS, treatment depends on whether or not the cancer has grown or spread. For second-line therapy options for locally advanced pancreatic cancer, [see Guide 16](#).

### Guide 16. Second-line therapy options for locally advanced cancer

Performance status		Second-line therapy options				
<ul style="list-style-type: none"> <li>• Poor PS</li> <li>• Cancer has spread</li> </ul>	➔	Palliative and best supportive care with: <ul style="list-style-type: none"> <li>• Systemic therapy (see <a href="#">Guide 17</a>) or</li> <li>• Palliative radiation therapy</li> </ul>				
<ul style="list-style-type: none"> <li>• Good PS</li> <li>• Cancer has not grown or spread</li> </ul>	➔	Consider resection (if possible)	➔	Adjuvant therapy (if needed)		
		<ul style="list-style-type: none"> <li>• Surveillance or</li> <li>• Clinical trial</li> </ul>	—			
<ul style="list-style-type: none"> <li>• Good PS</li> <li>• Cancer has grown or spread</li> </ul>	➔	One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy (see <a href="#">Guide 17</a>)</li> <li>• Chemoradiation (if not given before and if only the primary tumor is growing)</li> <li>• SBRT (if not given before and if only the primary tumor is growing)</li> </ul>	➔	PS is worse	➔	Palliative and best supportive care
				<ul style="list-style-type: none"> <li>• Good PS</li> <li>• Cancer has grown or spread</li> </ul>	➔	Clinical trial

Note: Imaging tests might be done to see how cancer is responding to treatment.

**Preferred options**

For locally advanced pancreatic cancer, joining a clinical trial is preferred if you have good PS. For poor PS, palliative and best supportive care should be considered. Talk with your doctor about what you want from treatment. Preferred systemic therapy options are those that have the best result and fewer side effects.

For good PS, there are no preferred systemic therapy options. Other options are available and are based on many factors. Likewise, for poor PS, if you chose to go with systemic therapy for second-line treatment, are preferred. Other options are available, but it depends on many factors. Your wishes play a role. You can always decide not to continue with systemic therapy. [See Guide 17.](#)

**Guide 17. Second-line systemic therapy options for locally advanced cancer**

Options	Good performance status		Poor performance status
<b>Preferred</b>	—		—
<b>Other</b>	<p>If gemcitabine-based therapy used before, then try one of the following:</p> <ul style="list-style-type: none"> <li>• 5-FU with leucovorin and liposomal irinotecan</li> <li>• 5-FU with leucovorin and irinotecan (FOLFIRI)</li> <li>• Modified FOLFIRINOX</li> <li>• Oxaliplatin with 5-FU and leucovorin (OFF)</li> <li>• FOLFOX</li> <li>• Capecitabine with oxaliplatin</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>	<p>If fluoropyrimidine-based therapy used before, then try one of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Gemcitabine with albumin-bound paclitaxel</li> <li>• Gemcitabine with cisplatin (only for <i>BRCA1</i>, <i>BRCA2</i>, or <i>PALB2</i> mutations)</li> <li>• Gemcitabine with erlotinib</li> <li>• 5-FU with leucovorin and liposomal irinotecan (if not had irinotecan before)</li> </ul>	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>
<b>Used only in some cases</b>	<ul style="list-style-type: none"> <li>• Pembrolizumab (only for MSI-H or dMMR tumors)</li> <li>• Larotrectinib (if <i>NTRK</i> gene fusion positive)</li> <li>• Chemoradiation (if not used before)</li> </ul>		—

**Poor PS**

If your PS is poor, then you may benefit from palliative and best supportive care with:

- Systemic therapy or
- Palliative radiation therapy

**Good PS**

If your PS is good and cancer has not grown or spread, your treatment options are:

- Surgery may be possible
- Surveillance
- Clinical trial

If your PS is good and cancer has grown or spread, your treatment options are:

- Clinical trial (preferred)
- Systemic therapy
- Chemoradiation
- SBRT

**Review**

- Germline testing is recommended for anyone with confirmed pancreatic cancer.
- Treatment options are based on your performance status (PS).
- If you have jaundice, a stent using ERCP will be placed before starting treatment.
- Those with poor PS may benefit from palliative and best supportive care with systemic therapy or palliative radiation therapy.
- Treatment options will be different if you have a *BRCA1*, *BRCA2*, or *PALB2* mutation.

A preferred treatment has the best result and fewer side effects.

# 8

## Treatment guide: Metastatic

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This chapter will guide you through treatment for cancer that has spread far from the pancreas. Together, you and your doctor should choose a treatment plan that is best for you.

Metastatic pancreatic cancer is cancer that has spread to distant sites in the body. Metastatic tumors are formed when cancer cells spread through the blood or lymphatic system to sites or organs that are far away from the pancreas.

The goals of metastatic pancreatic cancer treatment are:

- symptom relief
- quality of life
- longer survival

## Tests

Before beginning treatment for the cancer, your doctor will first test for and treat jaundice. Jaundice is a yellowing of the skin and eyes caused by a buildup of bilirubin in the body. Bilirubin is a yellow-brown substance in bile. It is a digestive fluid made in the liver.

A tumor in the pancreas can cause jaundice by blocking the bile duct that drains bilirubin out of the liver. To relieve symptoms of jaundice, your doctors will place a stent in the bile duct to relieve the blockage in your bile duct. You will not need a stent if you had a biliary bypass during a previous surgery or laparoscopy.

If not done before, then germline testing and gene testing of the tumor is recommended. Your doctor might order MSI and MMR testing. [See Guide 18.](#)

## Guide 18. Tests for metastatic cancer

### Tests before start of treatment

If there's jaundice,  
then self-expanding metal stent will be placed

- If not done before:
- Germline testing
  - Gene testing of tumor

- If needed:
- MSI testing
  - MMR testing

## First-line therapy

First-line treatment is the first treatment or set of treatments given to control the cancer. It is based on your performance status (PS). Good PS is usually PS 0 or PS 1. Poor PS is PS 2, PS 3, or PS 4.

Metastatic pancreatic cancer is not treated with surgery. The first-line therapy options for metastatic pancreatic cancer are shown in [Guide 19](#).

### Good PS

If your PS is good, your treatment options are:

- Clinical trial (preferred)
- Systemic therapy

### Poor PS

If your PS is poor, then you may benefit from palliative and best supportive care with:

- Systemic therapy or
- Palliative radiation therapy

## Guide 19. Therapy options for metastatic cancer

First-line therapy options		Second-line therapy options		
<b>Good PS</b> One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy</li> </ul>	➔	<ul style="list-style-type: none"> <li>• Poor PS</li> <li>• Cancer has spread</li> </ul>	➔	Palliative and best supportive care with: <ul style="list-style-type: none"> <li>• Systemic therapy or</li> <li>• Radiation therapy</li> </ul>
		<ul style="list-style-type: none"> <li>• Good PS</li> <li>• Cancer has spread</li> </ul>	➔	One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy</li> <li>• Radiation therapy</li> </ul>
<b>Poor PS</b> Palliative and best supportive care with: <ul style="list-style-type: none"> <li>• Systemic therapy or</li> <li>• Radiation therapy</li> </ul>		—		

Note: Imaging tests might be done to see how cancer is responding to treatment.



First-line systemic therapy options for metastatic pancreatic cancer are based on PS. Preferred are those with the best result and that have fewer side effects. [See Guide 20.](#)

### Good PS

If your PS is good, the preferred options are:

- FOLFIRINOX
- Modified FOLFIRINOX
- Gemcitabine with albumin-bound paclitaxel

### Poor PS

If your PS is poor, the preferred options are:

- Gemcitabine
- Capecitabine
- Continuous infusion 5-FU

## Guide 20. First-line systemic therapy options for metastatic cancer

Options	Good performance status	Poor performance status
<b>Preferred</b>	One of the following: <ul style="list-style-type: none"> <li>• FOLFIRINOX</li> <li>• Modified FOLFIRINOX</li> <li>• Gemcitabine with albumin-bound paclitaxel</li> </ul>	One of the following: <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>
	For <i>BRCA1</i> , <i>BRCA2</i> , or <i>PALB2</i> mutations only One of the following: <ul style="list-style-type: none"> <li>• FOLFIRINOX</li> <li>• Modified FOLFIRINOX</li> <li>• Gemcitabine with cisplatin</li> <li>• Consider olaparib</li> </ul>	
<b>Other</b>	One of the following: <ul style="list-style-type: none"> <li>• Gemcitabine with erlotinib</li> <li>• Gemcitabine</li> <li>• Gemcitabine with capecitabine</li> <li>• Fixed-dose-rate gemcitabine with docetaxel and capecitabine (GTX)</li> <li>• Oxaliplatin with 5-FU and leucovorin (OFF)</li> <li>• Capecitabine with oxaliplatin (CapeOx)</li> </ul>	—

## Second-line therapy

If first-line treatment doesn't stop the cancer from growing, then a second-line treatment might be an option. Second-line treatment is the next set of treatments given to control the cancer when the first or previous treatments failed to stop cancer growth. It is based on your performance status (PS). Your doctor will choose a different type of systemic therapy than you had before. [See Guide 21.](#)

### Poor PS

If your PS is poor, then you may benefit from palliative and best supportive care with:

- Systemic therapy or
- Palliative radiation therapy

### Good PS




For good PS, treatment options are:

- Clinical trial (preferred)
- Systemic therapy
- Radiation therapy

Followed by:

- Palliative and best supportive or
- Clinical trial

## Guide 21. Second-line therapy options for metastatic cancer that has spread

Performance status		Second-line therapy options		
Poor PS		Palliative and best supportive care with: <ul style="list-style-type: none"> <li>• Systemic therapy or</li> <li>• Palliative radiation therapy</li> </ul>		
Good PS		One of the following: <ul style="list-style-type: none"> <li>• Clinical trial (preferred)</li> <li>• Systemic therapy</li> <li>• Radiation therapy</li> </ul>		<ul style="list-style-type: none"> <li>• Palliative and best supportive care or</li> <li>• Clinical trial</li> </ul>

Note: Imaging tests might be done to see how cancer is responding to treatment.

**Preferred options**

For metastatic pancreatic cancer or cancer recurrence, joining a clinical trial is preferred if you have good PS. Best supportive care should be considered. Talk with your doctor about what you want from treatment. You can always decide not to continue with systemic therapy.

Preferred options are those with the best result and that have fewer side effects. For good PS, there are no preferred systemic therapy options. Other options are available and are based on many factors. Likewise, for poor PS, if you choose to go with systemic therapy for second-line treatment, no options are preferred. Other options are available, but it depends on many factors. [See Guide 22.](#)

**Guide 22. Second-line therapy options for metastatic cancer or recurrence**

Options	Good performance status		Poor performance status
<b>Preferred</b>	—		—
<b>Other</b>	<p>If gemcitabine-based therapy used before, then try one of the following:</p> <ul style="list-style-type: none"> <li>• 5-FU with leucovorin and liposomal irinotecan</li> <li>• 5-FU with leucovorin and irinotecan (FOLFIRI)</li> <li>• Modified FOLFIRINOX</li> <li>• Oxaliplatin with 5-FU and leucovorin (OFF)</li> <li>• FOLFOX</li> <li>• Capecitabine with oxaliplatin</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>	<p>If fluoropyrimidine-based therapy used before, then try one of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Gemcitabine with albumin-bound paclitaxel</li> <li>• Gemcitabine with cisplatin (only for <i>BRCA1</i>, <i>BRCA2</i>, or <i>PALB2</i> mutations)</li> <li>• Gemcitabine with erlotinib</li> <li>• 5-FU with leucovorin and liposomal irinotecan (if not had irinotecan before)</li> </ul>	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Capecitabine</li> <li>• Continuous infusion 5-FU</li> </ul>
<b>Used only in some cases</b>	<ul style="list-style-type: none"> <li>• Pembrolizumab (only for MSI-H or dMMR tumors)</li> <li>• Larotrectinib (if <i>NTRK</i> gene fusion positive)</li> <li>• Chemoradiation (if not used before)</li> </ul>		

## Review

- Before beginning treatment, your doctor will first treat symptoms such as jaundice.
- Germline and tumor testing are recommended for all patients with confirmed metastatic disease. MSI and MMR testing are done as needed.
- A clinical trial is the preferred first-line treatment and second-line treatment option for those with good performance status (PS).
- Those with poor PS may benefit from palliative and best supportive care with systemic therapy or palliative radiation therapy.
- Talk to your doctor about what you want from treatment. You can always decide not to continue with systemic therapy.



My husband had colon cancer and beat it. Years later, he got pancreatic cancer and we thought he could beat this too. My heart is with all the families who are facing this difficult cancer.

- Barbara

# 9

## Making treatment decisions

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Choosing which cancer treatment is best for you can be difficult. It is important to ask questions and engage in shared decision-making with your doctor.

## It's your choice

In shared decision-making, you and your doctors share information, discuss the options, and agree on a treatment plan. Your doctors know the science behind your plan, but might not know what is important to you. Tell your doctors your goals and concerns about treatment. By working together, you can decide on a plan that works best for you when it comes to your personal and health needs.

### Second opinion

After finding out you have cancer, it is normal to want to start treatment as soon as possible. While cancer can't be ignored, there is time to have another doctor review your test results and suggest a treatment plan. This is called getting a second opinion, and it's a normal part of cancer care.

Even if you like and trust your doctor, get a second opinion. If the new doctor offers other advice, make an appointment with your first doctor to talk about the differences. Do whatever you need to feel confident about your diagnosis and treatment plan. Ask questions and take notes during doctor visits. Bring someone with you to appointments.

Things you can do to prepare:

- Check with your insurance company about its rules on second opinions. You want to know about out-of-pocket costs for doctors who are not part of your insurance plan.
- Make plans to have copies of all your records sent to the doctor you will see for your second opinion. If you run into trouble having records sent, pick them up and bring them with you.

### Support groups

Support groups often include people at different stages of treatment. Some may be in the process of deciding while others may be finished with treatment. At support groups, you can ask questions and hear about the experiences of other people with pancreatic cancer. If your hospital or community doesn't have support groups for people with pancreatic cancer, check out the websites in this book.

You can also reach out to a social worker or a counselor. They can help you find ways to cope or refer you to support services. These services may also be available to your family, friends, and those with children, so they can connect and get support. Seek out supportive care services by asking your care team.

## Questions to ask your doctors

Possible questions to ask your doctors are on the following pages. Feel free to use these questions or come up with your own. Be clear about your goals for treatment and find out what you should expect from treatment.

## Questions to ask your doctors about testing and staging

1. What tests will I have?
2. When will I have a biopsy? Will I have more than one? What are the risks?
3. How soon will I know the results and who will explain them to me?
4. Who will talk with me about the next steps? When?
5. What genetic tests will I have? When?
6. What will you do to make me comfortable during testing?
7. Is my cancer resectable, borderline resectable, or unresectable?
8. Is my cancer locally advanced or metastatic?
9. Is the cancer in any other organs like my liver?
10. What does my stage mean in terms of survival?

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## Questions to ask your doctors about surgery

1. If my cancer is resectable, how much of my tumor will be removed?
2. What are the chances you can remove all of the tumor and I will have a negative margin?
3. What happens if during surgery you find you can't remove the tumor?
4. What other organs or tissues might be removed during surgery? What will this mean in terms of my survival and recovery?
5. How long will it take me to recover from surgery?
6. How much pain will I be in? What will be done to manage my pain?
7. How many pancreatic cancer surgeries have you done? How many of your patients have had complications? What are the complications?
8. What is the chance that this surgery will shorten my life?
9. Will I need a stent?
10. How will this surgery affect my ability to eat and digest food?

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## Questions to ask your doctors about treatment

1. What are my treatment choices? What are the benefits and risks? Which treatment do you recommend and why?
2. How will my age, performance status, cancer stage, and other health conditions limit my treatment choices?
3. How long do I have to decide about treatment?
4. Does this hospital or center offer the best treatment for me?
5. When will I start treatment? How long will treatment take?
6. How much will the treatment cost? How much will my insurance pay for?
7. What are the chances my cancer will return? How will it be treated if it returns?
8. I would like a second opinion. Is there someone you can recommend?
9. Is a clinical trial an option for me?
10. Which treatment will give me the best quality of life?

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## Questions to ask your doctors about side effects

1. What are the side effects of treatment?
2. What type of systemic therapy will I have? What are the side effects?
3. What are the side effects of surgery?
4. What are the side effects of a stent? A biliary bypass?
5. What are the side effects of pancreatic cancer?
6. How long will these side effects last?
7. When should I call the doctor about my side effects?
8. What medicines can I take to prevent or relieve side effects?
9. What else can I do to help with pain and other side effects?
10. Will you stop treatment if I have side effects?

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## Questions to ask your doctors about clinical trials

1. What clinical trials are available for my type and stage of pancreatic cancer?
2. What are the treatments used in the clinical trial?
3. What does the treatment do?
4. Has the treatment been used before? Has it been used for other types of cancer?
5. What are the risks and benefits of this treatment?
6. What side effects should I expect? How will the side effects be controlled?
7. How long will I be in the clinical trial?
8. Will I be able to get other treatment if this doesn't work?
9. How will I know if the treatment is working?
10. Will the clinical trial cost me anything? If so, how much?

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## Websites

### **American Cancer Society**

[cancer.org/cancer/pancreatic-cancer.html](https://cancer.org/cancer/pancreatic-cancer.html)

### **Let's Win! Pancreatic Cancer Foundation**

<https://letswinpc.org>

### **Lustgarten Foundation for Pancreatic Cancer Research**

[lustgarten.org](https://lustgarten.org)

### **National Cancer Institute**

[cancer.gov/types/pancreatic](https://cancer.gov/types/pancreatic)

### **National Coalition for Cancer Survivorship**

[canceradvocacy.org/toolbox/](https://canceradvocacy.org/toolbox/)

### **National Hospice and Palliative Care Organization**

<https://www.nhpco.org/patients-and-caregivers/>

### **NCCN Find a clinical trial**

[nccn.org/patients/resources/clinical\\_trials/find\\_trials.aspx](https://nccn.org/patients/resources/clinical_trials/find_trials.aspx)

### **NCCN Guidelines for Patients<sup>®</sup>**

[nccn.org/patients](https://nccn.org/patients)

### **Pancreatic Cancer Action Network (PanCAN)**

[pancan.org](https://pancan.org)

### **The National Pancreas Foundation**

<https://pancreasfoundation.org/>



## Words to know

### **adjuvant**

Treatment given after the main treatment used to rid the body of cancer.

### **best supportive care**

Treatment to improve quality of life and relieve discomfort.

### **bile duct**

A tiny tube or vessel in the body that drains digestive fluid (bile) from the liver.

### **biliary bypass**

Surgery to re-route the flow of bile, digestive fluid, from the common bile duct into the small intestine.

### **biliary stent**

A small plastic or metal tube-shaped device used to unblock a bile duct.

### **bilirubin**

A yellow-brown substance that is removed from blood by the liver and is part of bile.

### **borderline resectable**

Cancer that is confined to the pancreas but approaches nearby structures or has severe symptoms, raising concern that it might or might not be possible to remove all the cancer with surgery.

### **CA 19-9**

Proteins made by cancer cells and found in blood.

### **celiac plexus neurolysis**

Ethanol is injected into the nerves of the abdomen to block pain.

### **chemoradiation**

Treatment that combines chemotherapy and radiation therapy.

### **chemotherapy**

Drugs that kill fast-growing cells throughout the body, including cancer cells and normal cells.

### **cholangitis**

An infection of the bile ducts that drain digestive fluids out of the liver.

### **common bile duct**

A tiny tube that carries digestive fluid (bile) from the liver into the small intestine, which absorbs nutrients from eaten food.

### **computed tomography (CT)**

A test that uses x-rays from many angles to make a picture of the inside of the body.

### **contrast**

A chemical put into your body to make clearer pictures during imaging tests.

### **CT-guided FNA biopsy**

Use of pictures from a CT (computed tomography) scan to guide a thin needle to the right spot to remove a sample of tissue from the body for testing.

### **distal pancreatectomy**

Surgery that removes the widest part (body) and narrow end (tail) of the pancreas as well as other nearby organs.

### **ductal adenocarcinoma**

Cancer of the cells that line the pancreatic ducts and small tubes that fluids pass through, and make proteins that digest food.

### **duodenal bypass**

Surgery to re-route the path that eaten food takes from the stomach to the small intestine, which absorbs nutrients from food.

### **endoscopic retrograde**

### **cholangiopancreatography (ERCP)**

A test that uses x-rays and a thin, lighted tube that is inserted into the body to see the pancreatic ducts and bile ducts.

**endoscopic ultrasound (EUS)**

A test that uses a thin, lighted tube guided through the mouth and down the throat to take pictures of the inside of the body using sound waves.

**EUS-guided FNA biopsy**

Use of pictures from sound waves and a thin, lighted tube inserted through the mouth to guide a thin needle to the right spot to remove a sample of tissue from the body for testing. Also called EUS-FNA.

**fine-needle aspiration (FNA)**

Use of a thin needle to remove a small amount of tissue or fluid from the body to test for cancer cells.

**first-line treatment**

The first drug or set of drugs given to treat a disease. Might be followed by second-line or more lines of treatment.

**fluoropyrimidine-based therapy**

A combination chemotherapy regimen in which the main drug used is 5-FU (5-fluorouracil).

**FOLFIRINOX**

A combination chemotherapy regimen that includes 5-FU, leucovorin, irinotecan, and oxaliplatin.

**FOLFOX**

A combination chemotherapy regimen that includes 5-FU, leucovorin, and oxaliplatin.

**gastroenterologist**

A doctor who's an expert in diseases of the digestive system. This system contains organs that break down food for the body to use.

**gastrojejunostomy**

Surgery to bypass a blockage in the part of the stomach that empties into the small intestine.

**gemcitabine-based therapy**

A combination chemotherapy regimen in which the main drug used is gemcitabine.

**jaundice**

Yellowing of the skin and eyes due to a buildup of bilirubin in the body.

**laparoscopy**

A surgical test that uses a thin, lighted tube inserted through a small cut in the belly (abdomen) to see inside the belly area and possibly remove tissue for testing.

**liver function test**

A blood test that measures chemicals that are made or processed by the liver to check how well the liver is working.

**locally advanced pancreatic cancer**

Cancer that started in the pancreas and has grown into nearby blood vessels or tissues.

**local recurrence**

Cancer that came back after treatment. Found in or near the pancreas.

**magnetic resonance**

**cholangiopancreatography (MRCP)**

A test that uses radio waves and powerful magnets to make very clear pictures of the pancreas and bile ducts.

**magnetic resonance imaging (MRI)**

A test that uses radio waves and powerful magnets to make pictures of the inside of the body showing the shape and function of body parts.

**main pancreatic duct**

A small tube in the body that drains digestive fluids from the pancreas into the first part of the small intestine (duodenum).

**metastasis**

Cancer that has spread from the first tumor to another body part. Can be local (near the primary tumor) or distant.

**neoadjuvant**

The treatment given before the main (primary) treatment used to rid the body of cancer.

**palliative radiation**

Radiation used to relieve symptoms such as pain caused by pancreatic cancer or cancer treatment.

**pancreatic duct**

A small tube in the pancreas that digestive fluids pass through.

**pancreatic protocol CT**

A CT scan that is done in a certain way so that all of the pictures focus specifically on the pancreas to clearly show the pancreas, nearby blood vessels, and very tiny tumors elsewhere in your abdomen.

**pancreatoduodenectomy**

Surgery to remove the widest part (head) of the pancreas and parts of other nearby organs. Also called Whipple procedure.

**percutaneous endoscopic gastrostomy (PEG) tube**

A tube inserted through a cut in the abdomen and placed into the stomach to give food.

**performance status (PS)**

A rating of a person's symptoms and ability to do daily activities.

**Positron emission tomography (PET)**

A test that uses two picture-making methods to show the shape and function of tissue.

**primary treatment**

The main treatment used to rid the body of cancer. In resectable pancreatic cancer, surgery is the primary treatment.

**radiation therapy**

The use of high-energy rays (radiation) to destroy cancer cells.

**recurrence**

The return of cancer after treatment. Also called relapse.

**resectable**

Cancer that can be completely removed with surgery.

**surveillance**

Testing to watch for cancer growth. No treatment is given during this time.

**stereotactic body radiation therapy (SBRT)**

Radiation therapy given in higher doses to smaller areas over 1 to 5 sessions of treatment.

**superior mesenteric artery**

The large, tube-shaped vessel that carries blood from the heart to the intestines—the organ food passes through after leaving the stomach.

**superior mesenteric vein**

The large, tube-shaped vessel that returns blood from the intestines—organ food passes through after leaving the stomach—back to the heart.

**supportive care**

Treatment given to relieve symptoms caused by cancer or cancer treatment. Also called palliative care.

**surgical margin**

The normal-looking tissue around the edge of the tumor removed during surgery.

**total pancreatectomy**

Surgery to remove the entire pancreas and other nearby organs and tissues.

**unresectable**

Cancer that can't be removed by surgery.

**Whipple procedure**

Surgery to remove the head of the pancreas and parts of other nearby organs. Also called pancreaticoduodenectomy.



# NCCN Contributors

This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines<sup>®</sup>) for Pancreatic Adenocarcinoma. It was adapted, reviewed, and published with help from the following people:

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For disclosures, visit [www.nccn.org/about/disclosure.aspx](http://www.nccn.org/about/disclosure.aspx).

# NCCN Cancer Centers

Abramson Cancer Center  
at the University of Pennsylvania  
Philadelphia, Pennsylvania  
800.789.7366  
[penmedicine.org/cancer](http://penmedicine.org/cancer)

Fred & Pamela Buffett Cancer Center  
Omaha, Nebraska  
800.999.5465  
[nebraskamed.com/cancer](http://nebraskamed.com/cancer)

Case Comprehensive Cancer Center/  
University Hospitals Seidman Cancer  
Center and Cleveland Clinic Taussig  
Cancer Institute  
Cleveland, Ohio  
800.641.2422 • UH Seidman Cancer Center  
[uhhospitals.org/services/cancer-services](http://uhhospitals.org/services/cancer-services)  
866.223.8100 • CC Taussig Cancer Institute  
[my.clevelandclinic.org/departments/cancer](http://my.clevelandclinic.org/departments/cancer)  
216.844.8797 • Case CCC  
[case.edu/cancer](http://case.edu/cancer)

City of Hope National Medical Center  
Los Angeles, California  
800.826.4673  
[cityofhope.org](http://cityofhope.org)

Dana-Farber/Brigham and  
Women's Cancer Center  
Massachusetts General Hospital  
Cancer Center  
Boston, Massachusetts  
877.332.4294  
[dfbwcc.org](http://dfbwcc.org)  
[massgeneral.org/cancer](http://massgeneral.org/cancer)

Duke Cancer Institute  
Durham, North Carolina  
888.275.3853  
[dukecancerinstitute.org](http://dukecancerinstitute.org)

Fox Chase Cancer Center  
Philadelphia, Pennsylvania  
888.369.2427  
[foxchase.org](http://foxchase.org)

Huntsman Cancer Institute  
at the University of Utah  
Salt Lake City, Utah  
877.585.0303  
[huntsmancancer.org](http://huntsmancancer.org)

Fred Hutchinson Cancer  
Research Center/Seattle  
Cancer Care Alliance  
Seattle, Washington  
206.288.7222 • [seattlecca.org](http://seattlecca.org)  
206.667.5000 • [fredhutch.org](http://fredhutch.org)

The Sidney Kimmel Comprehensive  
Cancer Center at Johns Hopkins  
Baltimore, Maryland  
410.955.8964  
[hopkinskimmelfcancercenter.org](http://hopkinskimmelfcancercenter.org)

Robert H. Lurie Comprehensive  
Cancer Center of Northwestern  
University  
Chicago, Illinois  
866.587.4322  
[cancer.northwestern.edu](http://cancer.northwestern.edu)

Mayo Clinic Cancer Center  
Phoenix/Scottsdale, Arizona  
Jacksonville, Florida  
Rochester, Minnesota  
800.446.2279 • Arizona  
904.953.0853 • Florida  
507.538.3270 • Minnesota  
[mayoclinic.org/departments-centers/mayo-clinic-cancer-center](http://mayoclinic.org/departments-centers/mayo-clinic-cancer-center)

Memorial Sloan Kettering  
Cancer Center  
New York, New York  
800.525.2225  
[mskcc.org](http://mskcc.org)

Moffitt Cancer Center  
Tampa, Florida  
800.456.3434  
[moffitt.org](http://moffitt.org)

The Ohio State University  
Comprehensive Cancer Center -  
James Cancer Hospital and  
Solove Research Institute  
Columbus, Ohio  
800.293.5066  
[cancer.osu.edu](http://cancer.osu.edu)

O'Neal Comprehensive  
Cancer Center at UAB  
Birmingham, Alabama  
800.822.0933  
[uab.edu/onealcancercenter](http://uab.edu/onealcancercenter)

Roswell Park Comprehensive  
Cancer Center  
Buffalo, New York  
877.275.7724  
[roswellpark.org](http://roswellpark.org)

Siteman Cancer Center at Barnes-  
Jewish Hospital and Washington  
University School of Medicine  
St. Louis, Missouri  
800.600.3606  
[siteman.wustl.edu](http://siteman.wustl.edu)

St. Jude Children's Research Hospital  
The University of Tennessee  
Health Science Center  
Memphis, Tennessee  
888.226.4343 • [stjude.org](http://stjude.org)  
901.683.0055 • [westclinic.com](http://westclinic.com)

Stanford Cancer Institute  
Stanford, California  
877.668.7535  
[cancer.stanford.edu](http://cancer.stanford.edu)

UC San Diego Moores Cancer Center  
La Jolla, California  
858.657.7000  
[cancer.ucsd.edu](http://cancer.ucsd.edu)

UCSF Helen Diller Family  
Comprehensive Cancer Center  
San Francisco, California  
800.689.8273  
[cancer.ucsf.edu](http://cancer.ucsf.edu)

University of Colorado Cancer Center  
Aurora, Colorado  
720.848.0300  
[coloradocancercenter.org](http://coloradocancercenter.org)

University of Michigan  
Rogel Cancer Center  
Ann Arbor, Michigan  
800.865.1125  
[rogelcancercenter.org](http://rogelcancercenter.org)

The University of Texas  
MD Anderson Cancer Center  
Houston, Texas  
800.392.1611  
[mdanderson.org](http://mdanderson.org)

University of Wisconsin  
Carbone Cancer Center  
Madison, Wisconsin  
608.265.1700  
[uwhealth.org/cancer](http://uwhealth.org/cancer)

Vanderbilt-Ingram Cancer Center  
Nashville, Tennessee  
800.811.8480  
[vicc.org](http://vicc.org)

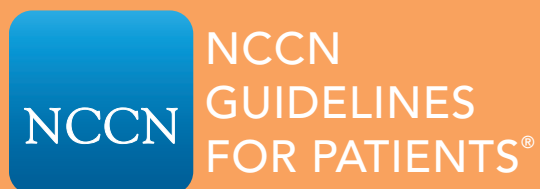
Yale Cancer Center/  
Smilow Cancer Hospital  
New Haven, Connecticut  
855.4.SMILOW  
[yalecancercenter.org](http://yalecancercenter.org)



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# Pancreatic Cancer

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